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LIGHT ✂ HEAT ✂ POWER ✂ BYE-PRODUCTS

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EDITORIAL NOTES.

Their Majesties at Beckton Gas-Works.

THROUGH the plain streets and humble homes of the East-end of London, Their Majesties the King and Queen wended their way last Saturday afternoon to keep an appointment at the Beckton Gas-Works, to which event there has been a great looking forward by all associated with the Gas Light and Coke Company—from the Governor (Mr. D. Milne Watson, D.L.) down to the humblest worker at the big station. Before the works were reached, for what seemed miles on the line of route, the tenants of the houses lined the streets, filled gaily decked windows, and gave the mightiest evidence within their power of their loyalty to, and affection for, their King and Queen. Similarly lined with enthusiastic workers and their families was the road leading through the flat lands far in which from the London side lies the enormous Beckton gas and chemical plant, which makes a 40 p.ct. contribution to the gas demands of the Company's area—no less than 265 square miles, including London north of the Thames and populous suburbs and districts beyond. On the works and in the sports grounds (to be visited later) it was one great family gathering—with the Governor and Mrs. Milne Watson at the head—of Directors, officers and wives, and the men, wives, children, and sweethearts. It was a great holiday for Beckton and all concerned in it (only those were at work who were obliged to be), for the King and Queen were honouring them and their works, and were their honoured guests.

And the works themselves. As we waited for the coming of the royal visitors, it was noted how fresh and bright looked the close-cropped grass bordering the main road, and the trees and shrubs. Everything seemed to have been swept and garnished or trimmed. From tall draped masts were festooned flags, bannerets, and pennants; and, looking round, one could see from the highest points of the plant flags fluttering in the gentle breeze. It was a gay scene, which, prior to the reception, was added to by the marching of the Rangers and the Company's ex-service men—hundreds and hundreds of them—and by the music of their band. The whole programme and arrangements constituted a grand piece of organization, in which many had taken part, but head and front executively, it may be opined, were Mr. Thomas Hardie, M.Inst.C.E., Engineer-in-Chief of the Company, and Mr. W. B. Leech, Engineer at Beckton. But everybody who could lend a hand for this day of days had done so; and therefore we must not mention more names. Later on we saw, too, how the retort-houses had had their light and ventilating openings and doorways whitewashed; and the men had put the houses and themselves into such a condition that a King and Queen or any other stranger to gas-making operations might have imagined that such places were always innocent of the slightest litter, that steam and dust were unknown, and that a stoker would shun such a thing as performing his duties in a work-begrimed shirt or vest, or would be seen at his daily duties with a dirty face. We admired it all. The spirit of this exceptional visit was over all; and it testified to a desire that the King and Queen should see them as they wished to be seen. It was Beckton's day; and the day that it was representing to the heads of a mighty Empire the vastness and importance of the work of the gas industry. Right well it was done.

The King and Queen learned much from their visit. As the King inspected the Rangers and the ex-service men, saw their decorations, and shook hands and conversed with several of them, he must have realized that men of such valour on the field of battle were men whose fealty to the Company which they serve, and in which they are co-partners, would be of the highest order. Hard by was the memorial statue to Sir Corbet Woodall, looking down upon a scene which, in life, would have stirred him deeply. But this was not the main thing for which Their Majesties were present; it was only the inaugural part of a long programme. It is rare that they visit an industrial establishment without engaging in the setting to work of something which is taking the place of that which formerly existed. We hardly remember a time when we have visited Beckton without finding something of fresh interest, because, in a place of such magnitude, change in some quarter is ever going on; and the Beckton of to-day is not in some particular the Beckton of yesterday. His Majesty on Saturday (as our illustrated report shows) set to work a new coal-unloading plant, the seat of which is on No. 1 pier, and is capable of unloading and transmitting to coal storage hoppers, by 54-in. wide belts, coal at the rate of 2000 tons per hour. The storage hoppers have a capacity of 6000 tons, or about thirty-six hours' supply for this station. This, it is believed, is the largest coal-handling plant in Europe—probably in the world. The King is by no means a stranger to the handling of coal; he had a good apprenticeship to it in the early years of his service in the Royal Navy; and therefore the keenness of his interest in the gigantic example of coal lifting (by grabs, each holding 3½ tons), transmission, and storage. Owing to the possibility of flying dust, and therefore discomfort to those occupying the marquee in which the machinery was started to work, it had been arranged to run the grabs empty—the receiving hoppers leading to the belt conveyors having been previously filled. But that did not satisfy the King. He wanted to see the work performed *ab initio;* and he had his way. The same keen interest on his part and on that of the Queen was evidenced later in witnessing the main processes—carbonizing and chemical—on the works. When they heard of, and saw, the wonderful variety of products yielded by coal as a result of its carbonization, they showed that they were not ignorant of the wicked waste of valuable properties resulting from the burning of raw coal; and both also testified their knowledge of the practical affairs comprised in domestic economy by referring to the advantage they find in being able to light and extinguish gas-fires as required. Furthermore, the King is surprised that more coke is not used as a domestic fuel, as he finds it very successful for producing a good incandescent fire, where gas-fires cannot be employed.

Their Majesties appeared to be in no hurry; they were so vastly interested by the great variety of operations in dealing with coal by the scientific means which release so much of its wealth, and place it at the service of man. More than two hours were spent by them on the works, and then nearly another hour on the Sports Ground, where they each planted a tree, which will be prized and cherished by the Company and men as commemorating a great occasion. The whole gas industry will also appreciate the visit. The industry is a great national institution which

serves with constancy the community in times of peace, and has helped the country in the days of peril and emergency—in the years of war, during the coal strikes, and railway troubles—with a fidelity which has on each occasion done much to relieve the situation. We regard the visit to Beckton as a recognition by Their Majesties of the work performed by the gas industry, and of its large part in the system of daily life. It was the honour and right of the Gas Light and Coke Company that this recognition should be made through the oldest and largest gas undertaking not only in Great Britain, but in the world. The graciousness and interest shown by the King and Queen during the afternoon will be a living memory with all who were present; and the ringing cheers which greeted them when they entered the works, at the close of the inspection of the Rangers and ex-service men, when the new coal-handling machinery was started, when the trees were planted on the Sports Ground, and as they finally left, will have convinced them that, among those responsible for the activities of the gas industry and the large army of workers in it, they have subjects whose loyalty is second to none.

Nearing the End.

The way is now fully paved for the miners, or as many of them as are required, to return to work; and it is not only the Mines Eight Hours Act which has facilitated this, but the revelations of the past week that the leaders of the other great trade unions found that it was impossible to work for the realization of a peaceful and sensible end with such mulish stubbornness as has been displayed by the dominating influence in the decisions of the Executive Council of the Miners' Federation. If there has been among the miners any strong feeling of loyalty to those leaders, it must have been sadly shattered by the condemnation of pseudo-leaders who could produce nothing constructive, and who were perpetually and monotonously croaking, "Not a penny off wages; not a minute on hours." The General Council of the Trades Union Congress lost patience with such men; and they saw that, however great the effort made to support the miners, it would be futile in the face of the attitude of the Miners' Federation and with an industry rendered practically bankrupt through economic conditions which cannot be improved without the application of reason and enhanced activity. At the same time, it is impossible to relieve from all blame the General Council of the "T.U.C." That body ought not to have taken any action—much less called a general strike, even had it been legal—until they were assured that the Miners' Federation were willing to be guided by those who were prepared so unprecedentedly, if mistakenly, to befriend them. Before that event (which showed the trade union world that the nation was still in existence, and possessed a will of its own), the "T.U.C." Council were well aware that the slogan which had been adopted by the President and Secretary of the Miners' Federation could not be upheld, and could not be applied. They knew of the enormous losses which their action would shower upon the country, and upon the employment of the members of trade unions throughout the industries; and yet they did the evil which will stand out in industrial history as the action of an obtuse intelligence which failed to compass possible effects. The only good result the lesson may have is as a deterrent to others who seek the attainment of ends by destructive means. However, it is not what the "T.U.C." General Council did in that regard, but their condemnation of the miners' leaders which is the important thing to-day. The miners have already suffered a loss in wages of some £27,000,000, which, with the losses in the trade of the industry has largely depreciated their "standard of living." All this is attributable not to the coal owners, but to the men's own leaders. The country has also spent nearly as much in subsidizing the industry this year; and the shrinkage of the operations of other industries and employment in them is immense. And this wretched business is the product of trade union leadership and policy! But the miners know now what the leaders of the other great unions think of the leaders in the Miners' Federation, and that what they think is not by any means complimentary. If the exposure does not cause a change in the leadership of the Federation, it will show that supineness and not intelligence is a marked trait of the miners; for the leaders have led the men to nowhere, and have accomplished much harm and no good. The organization is badly in need of officials possessing statesmanlike and diplomatic qualities, and not the accomplishments of pantaloons.

Not until Thursday did the Mines Eight Hours Bill pass the House of Lords, owing to an unfortunate circumstance, which was subsequently adjusted. It was found that the Yorkshire owners were proposing to revert to the division of proceeds in the ratio of 85 p.ct. to wages and 15 p.ct. to profit, instead of 87 p.ct. and 13 p.ct., which was the ratio in operation at the time of the stoppage, and which meant a variation from the 1924 agreement to that of 1921. The variation may be justified in the circumstances of the district; but the Government took a serious view, as it raised a new issue, of its possible effect upon the value of the Eight Hours Act in bringing the dispute to a definite close. They, therefore, delayed the final stages of the Bill in the hope that the Yorkshire owners would come into line, which they did. This enabled the Bill, after twenty-four hours' delay, to be read a third time in the Lords, and to receive the Royal Assent, which was done amid violent and vulgar scenes on the part of members of the Labour-Socialist Party, who seem to have completely lost their heads. The fact evinces their realization that the Act forms an effective instrument against which it is impossible for them to operate with any hope of success. Their aspirations of chaos have not materialized. The delay due to the Yorkshire owners' action also completely undermines the charge which the blatant ones in the Labour Party have so readily and repeatedly hurled at the Government, that they are biased on the side of the owners. Everybody else is perfectly satisfied that the Prime Minister and the Government have been very solicitous to hold the balance evenly, and were taking the only sane course to paving a way for the ending of the dispute, at the same time giving the industry an opportunity of getting back to an economic state, to the advantage of all concerned, which "all" includes the miners. Under the Act, the miners will, if they choose to do so, be able to return to work by, for the next five years, putting in the same amount of labour and producing the same output per man-shift as they did before 1919, and for that work they will, in the majority of cases, be paid the April wage which is higher than that obtainable in 1919. As a matter of fact, it has been found that there need be no wages cut for upwards of 750,000 men on the eight-hour basis. There are signs that the Miners' Federation see what this is likely to mean for them; and last week-end there were indications that there would probably be a struggle on their part, in order to save their own faces, to realize some form of agreement before the return march of the men reaches greater dimensions. One thing that is objectionable to them is the district agreement instead of a national one; but we do not see how they are now to avert the former, seeing that it has been proved that all districts cannot stand the April rates, and the Miners' Federation have made the inability to do so worse than before.

In the House last week, it was stated by Col. Lane-Fox that, between May 1 and July 3, 1,012,780 tons of coal from abroad were landed in England and Wales. Coal is coming to this country from all quarters in increasing quantities; and pithead stocks in other countries have been reduced almost to vanishing point. Contracts continue to be obtained by those countries where British coal formerly found a market; and more men are being employed in the mines abroad than there have been for many a long year. The latest reports from Germany inform us that, now that Ruhr coal has obtained such a large patronage in the former markets for British coal, the German selling syndicates intend to leave nothing undone to retain their hold upon those markets. The International Federation of Miners and labour's international promises have not done an atom of good to the miners of this country; and, indeed, they have not done any harm to the country itself—the whole of the tragedy which has been wrought have been due to our own miners and their incompetent leaders.

During last week, the question of the Government pur-

chases of coal was prominent; and it has, through the activities of the Labour-Socialists, been the centre of much foolish talk, which would lead one to suppose that, in the view of these labour representatives in Parliament, the Government should sit idle while the country is starving for fuel, in order that the most crazy policy imaginable on the part of the Miners' Federation might achieve some success—if such it could be called. For these purchases of coal from abroad, the House last Wednesday passed a supplementary estimate of £3,000,000. The presentation of the vote was made an excuse for another childish and boisterous display by certain of the lesser lights of the Labour Party, whose conduct must be a matter of very serious concern to those members in their part of the House who, at any rate, know how to behave themselves, and have some respect for the dignity of Parliament. It is not big for men to behave in this silly fashion. We are not inclined to think they do not know better, but believe that much of it is done merely for theatrical purposes, and to gain applause from the extremist element outside. The Government are making these purchases of foreign coal with the view of preserving the essential services of the country, for the small municipalities (who cannot be expected to enter the foreign market), and for domestic consumers. No part of the coal will be available for large consumers, who are expected to obtain their own supplies, the difference being, so far as they are concerned, that purchases have to be made abroad, either directly or through the usual agencies, instead of in the British coalfields.

Despite the passing of the Eight-Hour Act, which gives liberty to the miners to act in their own interests, the leaders of the Miners' Federation will not own that the game is up; but their actions and words are the best symptoms of an appreciation of an openly acknowledged truth. Meanwhile, the trade union world is rent asunder by the results of its own actions. The penalty for their members and the country at large is a heavy one, and will be felt for long to come.

Welding Gasholder Crowns.

THROUGH study and practice, Mr. Joseph N. Reeson, the Engineer-in-Chief to the Metropolitan Gas Company of Melbourne, is a strong advocate for welding, instead of riveting, gasholders and other plant on gas-works. He is, we believe, the first gas engineer to apply welding—he prefers the electric system—to the building and repair of gasholders; and, as his paper before the Institution of Civil Engineers showed (see "JOURNAL" for April 14 last), he has had in this direction an extensive experience, with holders large and small, on his own Company's works. The crown of a holder is the most difficult and critical part of such a structure to subject to the process of welding; and therefore considerable time was spent by Mr. Reeson to ascertain the best means of design and operation. He referred, in the paper before the Institution of Civil Engineers, to the design he has evolved. This he has patented; and, from the patent specification, we gave in the "JOURNAL" last week [p. 35] a description, with plan, of the new form of holder crown. It shows a design which is convenient for arc welding, which relieves the crown from a great deal of stress, and which is a protection to this vulnerable part of a holder. It will be seen that the crown is built-up first of straps of metal extending in a radial direction from a central cap to the curb at the circumference of the crown. These are the principal straps. Then intermediate rings are provided from which intermediate straps are taken, also to the peripheral curb. From each additional ring further, but shorter, intermediate straps are carried to the outer curb. The spaces between the radiating straps are filled in with sections of sheeting welded to one another and to the straps. In erecting the crown, the radial straps may be laid upon a framework of timber or metal such as is generally used to support the weight of the structure when not lifted by gas pressure. By this means the straps can be given any curvature required. A study of the plan published last week will show that a crown so constructed can be carried to any needed diameter, and that it makes an engineering job sound in every feature.

Low-Temperature Facts and Figures.

THE new President of the Society of British Gas Industries (Viscount Ednam, M.C.), in acknowledging his election at the recent annual meeting, stated that he had been to America for two months to study a process of low-temperature carbonization which he had been watching with interest during the past two years. It appears from his remarks that the process is that of Mr. McEwen, who has been in America collaborating with Dr. Runge. The system is being financed there, owing to the failure of an endeavour by Mr. McEwen some time ago to get it taken up here under the Trades Facilities Act. Further information is that experimental retorts have been in operation two years; and now a full-sized plant has been erected at the works of the Milwaukee Electric Railway and Light Company. These remarks by Viscount Ednam suggest that the time has come to sound a note of warning—not in reference to Mr. McEwen's process particularly, but in connection with low-temperature processes generally, inasmuch as there are several claiming consideration at the present time.

Low-temperature carbonization has in this country been under a heavy cloud for many long years—primarily owing to the enormous capital losses there have been through the operations of the old Coalite Company and certain successors. After the ghastly experience there has been, people naturally fight shy of financing low-temperature carbonizing processes; and we do not blame them if they are not satisfied beyond doubt that a process is technically sound, and has in it the making of a commercial success. Commercial success largely depends upon the technical soundness of a system, as well as upon the inherent properties and quantities of the products (having regard to the characteristics of the coal used), the demand for them, and their market values. We do not want to see a repetition of the squandering of good money over defective or ineffective processes. If money is to be spent, let it be upon processes which can prove their superiority over others. We should not, however, be surprised, in view of the interest that is being taken at the present time in such processes, if very shortly fresh companies are floated, and appeal is made to the public for capital. Before there is any response to such appeals, the public should be cautioned not to subscribe money to any of the ventures unless they have complete assurance as to their merits. Such complete assurance cannot be given until we have well-authenticated results from working experience or tests made by competent men, who should be independent of those who are immediately interested either as inventors or promoters. We place great importance upon tests being made by independent men of recognized competence, because in the past there has been published a considerable amount of data which those who are technically qualified to examine them are well aware have not been without weaknesses and, in most cases, extravagances. Therefore, if there is an outbreak of company promotion for low-temperature systems, we fear that, without the investigation for which we ask, there may be a repetition in some instances of the old deplorable experiences, which have meant terrible loss to many individuals who could ill-afford the sacrifice of capital and savings. It can be admitted that, in certain cases, very complete figures have been published; but what is wanted is similar completeness and good warranty in all cases, so that investigation can be made as to the relative values of the processes. In all cases where this is not done on the authority of a competent independent investigator well known in the carbonizing industries, then, when appeal is made for capital, the public should decline to make investment. We remember what happened in the early days of the Coalite concern, when the big drum was beaten with extraordinary skill, accompanied by prognostications on paper of a golden harvest. In the years that have passed, there have been reductions of capital, reconstructions, amalgamations, and what not; and those who originally invested money are the poorer for their rash venture. The plant has been constantly undergoing revision in design, and those who have money in the companies which are the direct descendants of the old Coalite concern are still waiting for the promised reward. Only on June 30 we reported a drastic reduction of capital

of the Low-Temperature Company, and an increase of the capital by the creation of new shares, in order to effect arrangements between that concern, Gas and Fuel Plants, Ltd., and the Barnsley Fuel Company, Ltd. There seems to be no finality to this sort of thing.

The history of low-temperature carbonization demands that there shall be, in this direction, greater security for investors; and only by the placing of facts and figures of an unimpeachable order before those who are competent to investigate them can there be sufficient assurance to justify the investment of money. Without such information and investigation, the public will be well advised to refrain from parting with money for any new ventures. In claims well founded and fully attested by independent authority, there can be more confidence. We hope those concerned in the various systems will take this suggestion in the spirit in which it is offered. To comply with it will be as much in their interest as in that of investors.

Gas-Flue Blocks and Building Bye-Laws.

The question of chimneys and flues is one which demands the consideration of the gas industry in more than one particular. The practices and bye-laws of local authorities in this regard appear to vary to a considerable extent. Attention was recently directed, through our columns, to a serious departure from the practice of chimneyed bedrooms to bedrooms altogether destitute of chimneys and flues, with the view to creating in such places a monopoly for electric heating. That is a condition which must be resisted—not only because it bars the application of gas-fires, but because the absence of a flue of any description in sleeping apartments is a retrograde step from the health point of view. Moreover, it limits the liberty of the tenant to select, as he pleases, one of the two labour-saving means of heating. In such a case it is Hobson's choice, and for that there is no justification. An active watch must, therefore, be kept on the efforts of our business rivals to set-up conditions which insist upon the application of their heaters only. Another point has cropped-up; and it is that some building bye-laws only permit of the construction of chimneys, and not simple flues. Building bye-laws, like other things, are apt, with progress in invention and knowledge, to become in their details somewhat old-fashioned. Considering that gas-fires do not require the spacious chimneys which the foul and voluminous products of coal combustion necessitate, and that the simple flues needed by gas-fires cut-down by no negligible sum the structural costs of chimneys, and still provide means of ventilation, there we have a distinct advance upon the old cumbersome and space-absorbing chimney; and due provision should therefore be made for gas-fire flues in all building bye-laws.

All such bye-laws have not been modernized in this way. It is time they were. The Redhill Gas Company a short time ago found that the Reigate Corporation bye-laws were not in this respect abreast of current requirements. The Company had made their plans for building some cottages for their employees; and they had at first the greatest difficulty in getting the local authority to agree to the use of gas-flue blocks for gas-fires, instead of the usual chimneys, for which only there was provision in the local building bye-laws. Eventually—after pointing out that the London County Council sanctioned the use of such blocks, although not in accordance with their regulations—the Company were allowed to proceed. The Corporation had no desire to be obstructive; on the contrary, they are manifestly favourable to a departure which assists in promoting comfort and healthier conditions. So it came about that, when the Company heard the Corporation were proposing to revise generally their building bye-laws, they suggested to them that provision should be made for the use of gas-flue blocks. The Company, however, could discover no precedent or formula to submit as to the lines the provisions should take. But after long negotiation, the terms of what was required were agreed, and became operative a short time ago, with the consent of the Ministry of Health. The Ministry, being responsible for the Smoke Abatement Bill, could not decline sanction to the commonsense provisions submitted to them.

We have obtained from Mr. W. H. Bennett, the Managing-Director of the Company, a copy of the provisions which have been adopted, as they may be useful to other gas administrators who are confronted with old bye-laws which have not been extended to meet modern circumstances. The first clause, referring to the construction of chimneys and flues, reads as follows:

> The foregoing bye-laws with respect to construction of chimneys shall not apply to any chimney so constructed, or any flue forming part of a chimney so constructed, as not to be capable of use except in connection with a fire or stove burning gas only, if the chimney or flue is constructed of such materials, and in such a manner, as to prevent the escape of the products of combustion into the building.

There is no difficulty in complying with the proviso forming the latter part of the clause. Then an addendum has been made to the existing bye-law respecting the construction of hearths. It reads:

> Provided that this bye-law shall not apply to any chimney opening which is so constructed as not to be capable of use except in connection with a fire or stove burning gas only, if provision is made effectually to prevent the flames of the fire from coming into contact with the floor of the room in which the chimney opening is situated.

No gas-fire has gas-flames which come in contact with the floor of the room; incandescent fuel does not drop from the fire as in the case of a coal fire; and no mischievous sparks fly from the fire. The old-style hearth is redundant where gas-fires are concerned. The clause is almost superfluous, other than as a necessary modification of the existing bye-laws regarding hearths. Finally, there is a provision which concerns ventilation. It reads:

> Provided that, in the case of a habitable room in which the fireplace and flue are constructed for use in connection with a gas-fire only, or are intended to be used in connection with a closed-in stove, such room shall be provided, in addition, with special and adequate means of ventilation by a sufficient aperture or air-shaft, which shall provide an unobstructed sectional area of 50 sq. in. at least.

That is an objectionable provision, though with a shaft-like flue provided for the gas-fire there is less occasion for a special ventilating aperture than in the case of a room without a flue, such as it is the wish of some electricians to make architecturally fashionable, with a motive so obvious that it needs no explanation, but with a thermal and monetary uneconomy for the tenant against which he needs the protection of all authorities who have control over the safety and health conditions of dwelling-houses.

The Reigate precedent for the amendment of building bye-laws in regard to this matter of the use of flue-blocks for gas-fires will no doubt be useful to many other gas undertakings, especially as the provisions have received the ratification of the Ministry of Health.

Gas-Coal Selling Combination.

A paragraph in the "Iron and Coal Trades Review" states that Lord Aberconway has given an outline of a scheme for the combination of leading South Yorkshire colliery interests. This sketch appears to have been in the nature of a preliminary announcement at the annual meeting of the Dinnington Main Colliery Company, Ltd. We have no details regarding it; but it is stated that there are at the moment two important projects under consideration—viz., (1) The formation of a gas-coal selling combination, and (2) a financial amalgamation. It looks as though there is here a matter which the gas industry should look into.

Coke Merchants and Producers.

We are glad to see the attitude of the Bexhill Town Council on the subject of coke prices during the present emergency. At a recent meeting of that body, there was a discussion on a letter which had been received from the Bexhill Coal Merchants' Emergency Committee, which stated that the following prices had been agreed to for coke: Unbroken, 48s. per ton, or 2s. 9d. per cwt.; broken, 50s. per ton, or 3s. per cwt. The Merchants' Emergency Committee requested the Council to charge the same prices. The Council are distributing coke, during these difficult times for fuel, at 28s. per ton, and they refused to change that price. Comparison of the Council's

figure with those of the Emergency Committee indicates that the latter were attempting to utilize the present scarcity of fuel for making undue profit from coke. If the Council's retail price is 28s., it may be assumed that the merchants are able to obtain supplies at something below that.

Value of Coke.

At a recent smoke abatement conference in Leeds, there was some discussion regarding domestic smoke; and it is stated that the conclusion was arrived at that both gas and electricity at present prices are too expensive for the ordinary householder; and the only substitute possible, as coming within his means, is coke. Such a definite statement requires some qualification. Judging by the millions of gas cookers and gas fires which are in use in the country, present prices are not too expensive (to the extent of use) for the major part of our householders. Were they too expensive, cookers and fires would not be employed, nor would the gas business of the industry expand at the rate which has been experienced during the past few years. At the same time, it may be frankly admitted that even greater use in these directions would be made were the price of gas still lower. Price is, of course, a large factor in this matter, and, as opportunity allows, it will be reduced. On the same occasion, a Committee representing the West Riding local authorities reported that they were in favour of the use of coke for general household purposes; and they recommended that all coke produced for domestic purposes should be standardized, and sold at as cheap a rate as possible, so as to bring it within the means of the poorest householder. Dr. J. J. Jervis, the Medical Officer of Health for Leeds, related his own domestic experiences in the use of coke. He stated that, if properly graded and fed into the grate, it could be burned successfully, even in ordinary stoves and ranges. Ungraded coke in the past has caused a great deal of prejudice in the public mind; and it is this prejudice which, in Dr. Jervis's opinion, stands in the way of a large advance being made in the demand for coke. It is, therefore, this prejudice which it is necessary to attack; but it must be accompanied by the proper preparation of coke for the purpose to which it is to be applied. A proposal was adopted that local authorities should have power to examine all plans of new houses to be erected in their areas, with the view particularly of ensuring the introduction of a type of heating appliance which would burn coke or other smokeless fuel.

Electricity Supply Bill.

Better headway has been made with the Electricity Supply Bill during the past week; and the Committee have now passed the thirty-fourth clause, which leaves for consideration the proposed amendments relating to the final batch of clauses and schedules, together with a number of clauses which various sections of the electricity industry desire shall be incorporated in the Bill. How much longer this will take cannot be foreseen. It may be mentioned that, under sub-section 1 of clause 21, the new Central Board may enter into arrangements, with any local authority, company, or person producing electricity by means of water power, waste heat, or otherwise, for the purchase of any surplus electricity. Authority is also given to the Board, subject to order by the Electricity Commissioners, to exercise such powers, including the breaking-up of roads, as may be necessary for the purpose of transmitting the purchased electricity. It will be seen that, under this section, if any gas undertaking has surplus electricity which can be disposed of by keeping its generating plant running at better load than its own requirements permit, it may be able to find the Board a useful purchaser. There was a long discussion last week of clause 26, which grants power to the Treasury to guarantee loans to the Central Board. The clause was passed.

Sulphate of Ammonia Exports.

In considering the quantity of sulphate of ammonia exported during May, we must not forget the general strike, and the impossibility of moving materials for something like half the month. Nevertheless, the quantity of sulphate shipped was 8613 tons, compared with 15,412 tons in May, 1925. The total for the five months is only 90,813 tons, which compares with 114,464 tons for the like period of 1925—a reduction of 23,651.

Tar Products Shipments.

Such a small business was done abroad in benzole, toluole, and naphtha in May that we will only point to the fact that in the five months of this year 418,388 gallons of benzole and toluole were shipped, as compared with 136,968 gallons in the corresponding period of 1925. Of naphtha, 46,506 gallons were exported in the same period, as compared with 21,814 gallons in that of 1925. Regarding tar oil, creosote, &c., May witnessed a shipment of 4,175,437 gallons, as compared with 4,217,855 gallons in May, 1925. The total for the five months was 19,973,697 gallons, as against 16,161,867 gallons in the same period of 1925.

Gas Oil Imports.

In May, the quantity of gas oil received in this country was 2,406,530 gallons, which compares with 4,928,439 gallons in May, 1925. In the five months ending May, 26,712,469 gallons were brought ashore, as against 26,324,267 gallons in the same period of 1925.

Smoke Abatement Bill.

Preparatory to the work of the Standing Committee on the Smoke Abatement Bill, a considerable number of amendments have been tabled. It is likely that the industrialists in the House will try to modify the stringency of the measure in regard to industry; and, in all probability, something will be done to attempt to strengthen the powers of local authorities in the direction of domestic heating—mainly, it may be imagined, by giving them power to amend their by-laws, so far as they affect new buildings.

Housing Progress.

It is reported that since the end of March and up to May 31, 21,826 houses have been completed in the housing schemes of local authorities in England and Wales. This is exclusive of upwards of 23,000 houses rated at or under £25 a year, which have been completed in the same period by private enterprise, unassisted by any form of subsidy from public funds. If this rate of progress continues during the remainder of the summer, it is expected that a total of at least 180,000 houses will be built this year, as compared with the 105,000 houses which was the highest total reached in any pre-war year. The field for new business for the gas industry is being extended at a good rate.

PERSONAL.

In last week's "JOURNAL" it was mentioned that Miss MARGARET F. EURICH has been awarded an Honours Degree (2nd class) in Gas Engineering at the University of Leeds. Prior to taking up post-graduate work at Leeds, Miss Eurich took a B.Sc. Degree at London University, her principal subject being chemistry. Her work at Leeds occupied two years, and in the second year was concerned with the comparative behaviour of solid fuels in the domestic grate, on which research she presented a thesis.

The Senate of the University of Leeds have awarded the following Fellowship and Scholarship: Gas Research Fellowship, J. A. SUTCLIFFE, B.A. Oxon.; Corbet Woodall Scholarship, C. B. BOLLAND.

FORTHCOMING ENGAGEMENTS.

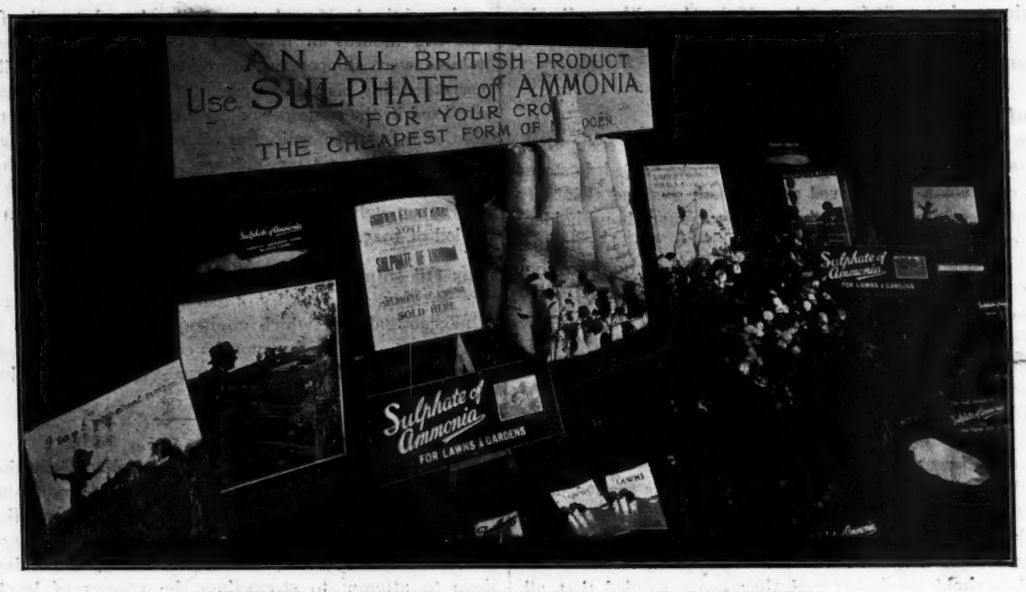
[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

July 19.—INSTITUTION OF CHEMICAL ENGINEERS.—Annual meeting.
July 19-23.—SOCIETY OF CHEMICAL INDUSTRY.—Annual meeting.
July 20.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at No. 28, Grosvenor Gardens, S.W. 1, at 2.30.
Aug. 17-18.—IRISH ASSOCIATION OF GAS MANAGERS.—Annual meeting in Dublin.
Sept. 6-18.—SMOKE ABATEMENT EXHIBITION, at Birmingham.
Sept. 9.—"B.C.G.A.," MIDLANDS DISTRICT CONFERENCE.—Smethwick.
Sept. 14-16.—INSTITUTION OF PUBLIC LIGHTING ENGINEERS.—Conference at Newcastle.
Sept. 20.—EVENING STAR LODGE.—Emergency Meeting.

INSTITUTION OF GAS ENGINEERS.

July 24.—Education Conference.
Sept. 21-23.—Postponed Annual Meeting.
Sept. 24.—Visit to Hastings.

SUCCESSFUL SULPHATE OF AMMONIA EXHIBIT.



SULPHATE OF AMMONIA WINDOW DISPLAY AT SOUTHAMPTON.

We have received from Mr. J. R. H. Jacobs, the General Manager and Secretary of the Southampton Gas Light and Coke Company, a photograph (of which we give a reduced reproduction) of a recent window display of sulphate of ammonia. As an advertising agent, this was eminently successful. During the month of the display, the Company sold no fewer than 579 small bags of sulphate of ammonia. This sort of business has a permanent beneficial effect. The suggestion may be valuable to many of Mr. Jacobs' colleagues in the gas industry.

INSTITUTION OF GAS ENGINEERS.

The Emergency Committee, under the direction of the Council, have opened the balloting lists for new members, associate members, and associates, and have found that all the candidates have been duly elected. The list is as follows:

Members.

Aitken, H. A., General Manager, Gas-Works, Leven, Fife.
Barrett, Charles Gerald, Chief Assistant Engineer, Gas-Works, West Hartlepool.
Blake, Thomas Vincent (Institution's Diplomé in Gas Engineering, 1925), Technical Assistant and Chief Chemist, Gas-Works, Cardiff.
Bottomley, Joe William, Engineer and Manager, Gas-Works, Milnrow.
Brockway, Fred Garrett, Engineer, Manager, and Secretary, Gas-Works, Cleethorpes.
Bullmore, A. W. E., Engineer, Gas-Works, Letchworth.
Dyson, Thomas (Institution's Diplomé in Gas Engineering, 1925), Works Superintendent, Longwood Station of the Huddersfield Corporation Gas Department.
Ellis, George William, Manager, Gas-Works, Berkhampstead.
Halliwell, Jesse Ormston, Engineer and General Manager, Gas-Works, Mullingar, Ireland.
Hornby, Percy Hulme, Chief Assistant Engineer, Gas-Works, Southall, Brentford.
Hudson, Beaumont, Engineer and Manager, Gas-Works, Pontefract.
Hultman, Gustaf Henrik, Chief Engineer, Gas-Works, Stockholm.
Lacey, Leonard, B.Sc. (Eng.), Assistant Engineer (Resident), Stratford Works of the Gas Light and Coke Company.
Morrison, James, Engineer, Gas-Works, Ballymena, Ireland.
Reece, Thomas Henry, Engineer, East Kent Gas Company.
Rooney, Joseph Augustine, Engineer and Manager, Gas-Works, Drogheda, Ireland.
Shewring, Harold, Engineer and Manager, Gas-Works, Rochdale.
Simmonds, Vernon, Assistant Engineer, East Greenwich Station of the South Metropolitan Gas Company.
Sutcliffe, Herbert, Manager and Secretary, Gas-Works, Gowerton.
Watson, Peter Mountain, Manager, Gas-Works, Cleveland.
Yates, Arthur Farrar, Engineer and Manager, Gas and Water Works, Goole.

Associate Members.

Akroyd, John Edwin, Assistant Manager, Great Western Railway Gas-Works, Swindon.
Calderwood, Robert Wallace, Assistant to Engineer and Manager, Gas-Works, Spalding.
Canning, T. Anthony, Assistant to Engineer and Manager, Gas-Works, Dewsbury.
Clarke, Bernard, Assistant Engineer, Gas-Works, Long Eaton.
Dunbar, Harry Clifford, Assistant Manager, Gas-Works, Hemel Hempstead.
Escreet, Hubert John, B.Sc. (Eng.), Assistant Distributing Engineer, Gas Light and Coke Company.
Galleway, Harold, Assistant Manager, Gas-Works, Whitby.
Goldsmith, James Howard, Works Assistant, Sydenham Station of the South Suburban Gas Company.
Kirkhope, John, Shift Chemist, Tottenham District Light, Heat, and Power Company.
Le Fevre, Reginald Nelson, Draughtsman and General Assistant in Distribution Department, Gas Light and Coke Company.
Maitland, William Barclay, Works Superintendent Gas-Works, Malta.
Pallister, John Walton, Technical Assistant, Gas-Works, Middlesbrough.
Risby, Harry James, Technical Assistant, East Greenwich Station of the South Metropolitan Gas Company.
Shadbolt, Robert, Assistant Engineer, Gas-Works, Ascot.
Skinner, Alec George, Engineer's Assistant, Gas-Works, Redhill.
Smith, Ernest Philip, Assistant Engineer, Gas-Works, Chelmsford.
Smith, Joseph Frank, Senior Technical Assistant, Gas-Works, Leamington.
Thorpe, Benjamin, Chief Chemist, Longwood Station of the Huddersfield Corporation Gas Department.
Weaver, Leonard John, Technical and General Assistant, Gas-Works, Dover.
Williams, Rowland Joseph, Assistant Engineer and Manager, Gas-Works, Abertillery.
Wright, Stewart Lord, Junior Assistant Engineer, Gas-Works, Birkenhead.

Associate.

Benham, Harold Francis, Assistant Engineer, Messrs. L. Askew & Son, Westminster.

Southern Association of Gas Engineers and Managers (Eastern District).—A meeting will be held on Tuesday next, July 20, at the Institution of Gas Engineers, 28, Grosvenor Gardens, S.W. 1, at 2.30.

Manchester District Institution.—We learn from the Hon. Secretary (Mr. William Rogerson) that the summer meeting of the Manchester District Institution of Gas Engineers has been postponed until after the Institution Meeting in London.

THE KING AND QUEEN AT BECKTON.

Interest of Their Majesties in a Great National Industry.

Beckton, the place of big things, had a big day on Saturday last, when His Majesty the King, who was accompanied by the Queen, opened a new coal handling plant which has been installed by the Gas Light and Coke Company, and subsequently saw some of the wonders connected with a more than century-old industry.

BECKTON FROM THE AIR.

Their Majesties (with the Right Hon. Steel-Maitland, Bart., M.P., as Minister in attendance) drove from Buckingham Palace by way of Barking Road and Beckton Road, where they were warmly greeted by thousands of loyal subjects young and old, to the gaily decorated entrance to the gas-works, which was reached about 3 o'clock. Here they were received by Mr. D. Milne Watson, M.A., LL.D., D.L., the Governor of the Company; there being also present at the ceremony Mr. Henry Woodall (Deputy Governor), Mr. R. M. Holland-Martin, C.B., Col. the Hon. Clive Bigham, C.M.G., C.B.E., D.L., Mr. T. Goulden, General H. B. Hartley, C.B.E., M.C., F.R.S., and Mr. R. J. N. Neville, M.P. (Directors), the Mayor of East Ham, and the Chairman of the Barking Urban District Council. The Queen (who had been previously presented with a handsome bouquet by the little daughter of one of the employees) stood conversing with Mrs. Milne Watson and the Deputy Governor, while the King inspected the two companies

THE KING INSPECTS LONG RANKS OF RANGERS AND EX-SERVICE MEN.

of the Rangers' Battalion of the London Regiment (of which Mr. Milne Watson is Honorary Colonel) now officered and manned by the Gas Light and Coke Company, as well as some 360 ex-service men, who bore their records upon their breasts, in the form of anything up to six medals apiece. Then there were presented to His Majesty the principal officials of the Company and several of the oldest employees.

Beckton's Railway.

Beckton possesses a very complete railway system extending over 60 miles, and controlled by signals of the same type as those used on the Underground Railways; and this was utilized

His Majesty Starting the New Machinery.

to take the Royal party from point to point on their tour of inspection. Ordinarily, of course, it is engaged on the more prosaic task of distributing to the retort houses or to the storage heaps the huge quantity of coal carbonized annually at Beckton, and dealing with the transmission of the secondary products. The works are responsible for over 40 p.ct. of the Company's make of gas; the remaining 60 p.ct. being distributed over a dozen smaller works. Under the high-level railway no less than 250,000 tons of coal can be stored.

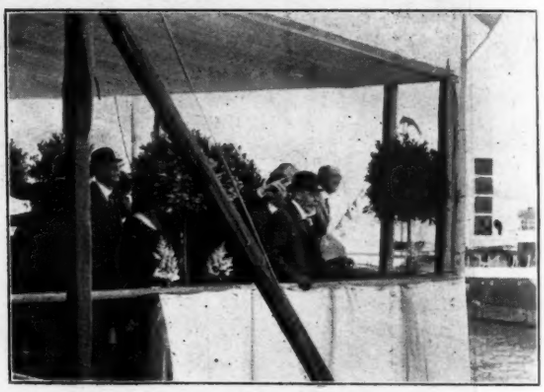
In addition to the coal which is brought direct from the Durham fields in the Company's own ships and unloaded for carbonization at Beckton, a considerable proportion of the coal required for the other works of the Company is here transferred from the colliers into barges. The continued growth of the Company's business has naturally resulted in extensions to the coal unloading plant being undertaken from time to time; and upon each occasion it has been possible to introduce modern practice.

It was the newest and largest of these extensions which was responsible for Saturday's gratifying function.

On the Pier.

The ceremonies already noted over, the Royal saloon proceeded to the foot of No. 1 pier, at the end of which a stand had been erected to accommodate some 350 people, who faced the platform provided for their Majesties.

It may be explained here that the original pier (No. 1), which was constructed in an L shape when the works was laid down in 1870, and was then fitted with small hydraulic cranes and skips, was later enlarged to a T shape, and in 1893 was superseded for coal unloading by the No. 2 pier, which was specially erected for this purpose, and was equipped with twelve hydraulic



His Majesty Watching the Working of the Conveyor.

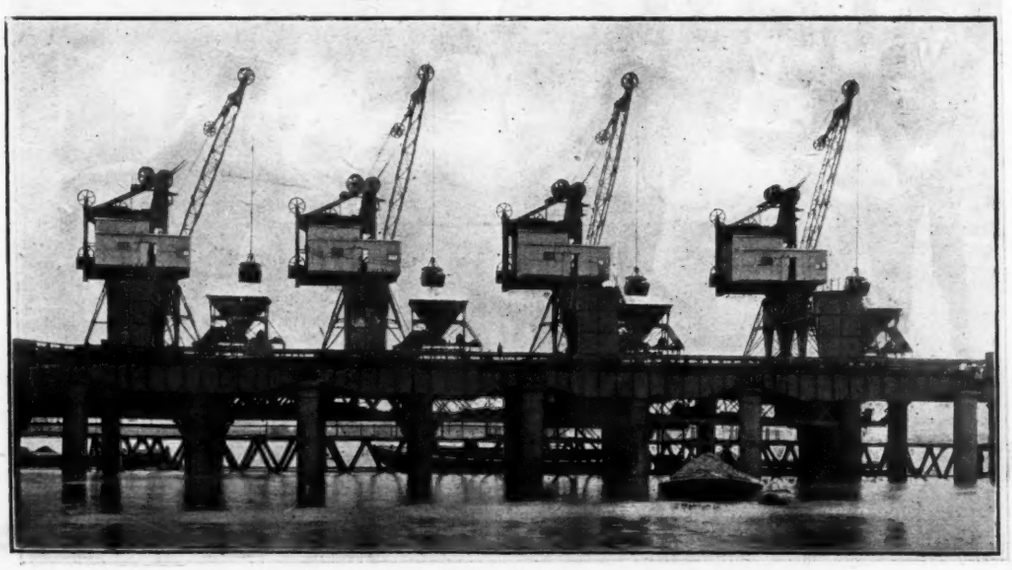
luffing cranes and automatic grabs. The old pier was used for the handling of residual products. The unloading plant erected on No. 2 pier 33 years ago has gradually become inadequate, and has now been replaced by a new plant on No. 1 pier, and the No. 2 pier will be used for the loading of residuals.

Though the weather on Saturday was threatening, it fortunately remained dry, and the light was perhaps that in which the "industrial portion" of the River Thames looks at its best. At any rate, the bunting-trimmed pier, with a flag-bedecked collier lying alongside, made a pretty setting for the ceremony which the King had undertaken to perform.

Largest Coal-Unloading Plant in Europe.

The Governor addressed the King in the following words:

> I desire, on behalf of my colleagues on the Board and myself, to express our high appreciation of the great honour Your Majesties have conferred upon this Company by visiting our works at Beckton to-day.
>
> This Company was founded in the year 1812—114 years ago—by a Charter granted by King George III. It is the oldest Gas Company in the world, and it is also now the largest.



A GENERAL VIEW OF THE NEW PLANT ON NO. 1 PIER.

THE CONCRETE VIADUCT APPROACH TO THE HOPPER AND THE SIX SETS OF RAILS BELOW THE DISCHARGE DOORS.

An industry founded so long ago can only keep its place in the world by developing with the times and applying the discoveries of science and adopting modern improvements.

This new coal handling plant is capable of unloading 2000 tons an hour, and is the largest coal unloading plant in Europe.

I have much pleasure in asking Your Majesty graciously to pull the lever and start the plant.

GAS INDUSTRY ESSENTIAL.

HIS MAJESTY THE KING, in response, said:

I am very glad to visit this old-established gas-works at Beckton, and to inaugurate the important addition to the plant, for I realize how essential the gas industry is to the daily life of the community.

THE NEW COAL HANDLING PLANT.

The King then moved a lever, which at once started the plant upon what should be a long and useful career. It is a scheme upon which much care and skill has been expended, from the foundations upwards. In order to carry the weight of the new cranes (120 tons each), 20 caissons were sunk into the river bed to the chalk; and upon these has been placed a girder structure spanning the pier, and bearing the crane tracks. This work was carried out by Sir William Arrol & Co., Ltd. Upon each arm of the T-shaped pier there will be four Shoesmith electric travelling cranes of the portal and centre-post type. Four of these are completed, and the remainder are in hand. Each crane is fitted with a Priestman grab of 3½ tons capacity, and is capable of dealing with 250 tons per hour.

The cranes deliver into small hoppers, and thence into two belt conveyors—one on each arm of the pier—each of a capacity of 1000 tons per hour; the coal being automatically weighed in transit. These conveyors are 48 in. wide, and travel at a speed of 500 ft. per minute. At the junction of these conveyors the coal passes either to chutes for loading barges or to a third belt conveyor of 2000 tons per hour capacity, which leads to a fourth belt on the shore feeding that over the coal storage hoppers. These three belts are 54 in. wide, and travel at a speed of 600 ft. per minute. The belts are designed upon the Robins system; and the cranes, belt, and conveyor supporting structures were supplied entirely by Messrs. Fraser & Chalmers, of Erith.

The coal storage hoppers are of re-inforced concrete, and hold 6000 tons of coal. The base of the bunkers is 31 ft. above the ground level, and 12½ ft. above the works overhead railway system. The total height of the bunkers to the roof of the conveyor housing is 83 ft. The hoppers were designed by the Considere Construction Company; and the whole of the construction of them and of the concrete viaduct connections to the original overhead railway system was carried out by the Concrete Piling Company.

The coal is removed from the hoppers by trains of sixteen trucks having a total capacity of 80 tons of coal. The trains are shunted into any of the six tracks beneath the hopper which lead from the high-level railway system, and when in position automatically unlock the balanced discharge doors, and are rapidly loaded ready for transport to the retort houses, &c. The space between the railway deck and the ground level forms an engineers' store.

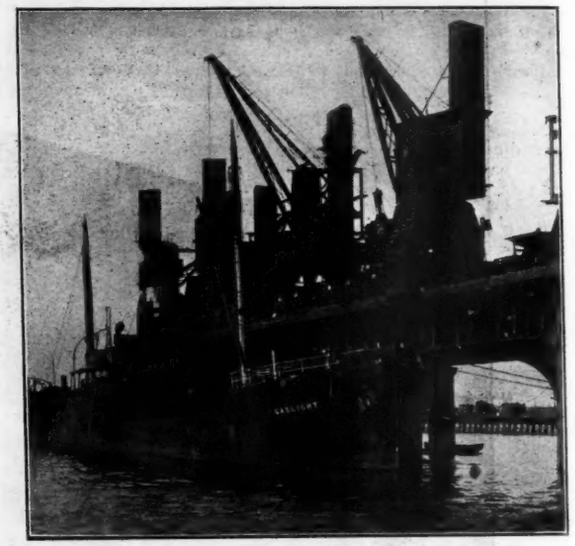
The power for the cranes and belts, and for other purposes, is generated by steam raised in waste-heat boilers.

THE BEST USE OF COAL.

Resuming the tour, a visit was paid to No. 6 retort house, where the King showed himself much interested in the actual process of gas manufacture. From this point it was but a few

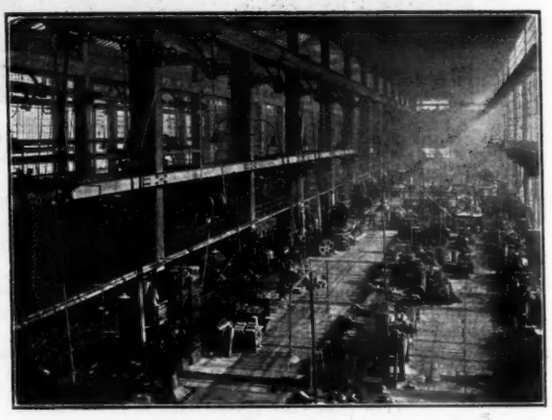
THE 6000 TON STORAGE HOPPER.

A General Survey, showing the Position of the Plant in Relation to the Viaducts with Gas-Oil Tanks in the Foreground.



The Old Displaced Plant on Pier, with the "*Gaslight*" alongside.

Central Bay of the Workshops at Beckton.



Side Bay of the Workshops at Beckton.

yards to the magnificent mechanical engineers' shop, where another stop was made; and from there a longer ride followed to the chemical works, where the Royal guests took tea, after being shown samples of tar, and then of the marvellously beautiful products that are obtained from it. There were seen, with many other interesting things, prussian blues of glorious shades, and naphthalene white as snow. An exhibit in model form drew attention to:

A Ton of Coal and Its Products.

Mixed Gas.—Containing approximately 30 p.ct. of water gas. About 3 cwt. of the coke is used to produce the water gas.

THE KING AND QUEEN WALKING THROUGH THE SPORTS GROUND.

The Queen Plants a Tree on the Sports Ground.

The King also Plants One.

Mixed gas, 84 therms—72 therms of coal gas, and 12 therms of water gas.

Coke.—7 cwt. produced for sale.

Tar.—10 gallons.

Ammonium Sulphate.—25 lbs.

Clinker.—40 lbs. waste from manufacture of water gas. Sometimes sold for filter beds of sewage farms and foundations for roads.

And the Wasteful Coal Fire.

It was here that the Queen, realizing the value of the various products saved by the gas industry, but lost when coal is consumed for heating purposes in its raw state, is said to have exclaimed: "How wasteful coal fires are," and the King to have remarked that in places where he could not have a gas fire he had successfully tried coke fires.

Chemical Bye-Products Works.

Of the Company's annual make of tar (24 million gallons), ammoniacal liquor (70 million gallons), sulphur, crude benzole, and cyanogen, the greater part is dealt with at the Beckton Chemical Works. Among the products of the works are:

Road tar, 6,000,000 gallons a year.
Pitch, 50,000 to 60,000 tons a year.
Creosote, 5 million gallons a year.
Motor spirit, 1½ million gallons a year.
Pure toluole and solvent naphtha (for the rubber industries).
Naphthalene (for dyestuffs, "mothballs," &c.).
Pyridine (for "denaturing" alcohol).
Carbolic acid.
Beta naphthol (an intermediate dye-product); capacity of the plant, 800 to 1000 tons a year.
Bleaching powder (as a bye-product of the manufacture of beta naphthol).
Salicylic acid (for aspirin, &c.).
Prussiate of potash and soda (for dyes, &c.).
Blues (for inks, paints, and linoleum dyes, &c.).
Sulphuric acid.
Sulphate of ammonia, about 16,000 tons a year.
Liquid ammonia.
Anhydrous ammonia (for refrigerating plants).

Sports Ground at East Ham.—Planting of Commemoration Trees.

The day's proceedings concluded at the Eastern Division Sports Ground of the Company, at East Ham, where, outside the governor house, the members of the Sports Committee were presented to the King, and subsequently Their Majesties each planted a tree. The Company's Sports Association have in all nearly 100 acres of ground in various parts of London, providing facilities for almost every kind of sport and recreation. The employees in the eastern area have grounds at Beckton and Woodford, in addition to that at East Ham which was on Saturday the centre of interest.

A Fine Example of Organization.

Many features stand out from what was for all concerned a memorable day. The interest taken by Their Majesties in all they saw was extraordinary, as witness the fact that they spent over two hours in the gas and chemical works, and the greater part of another hour on the sports ground. The King, too, by the remarks he made, and the questions he asked of those accompanying him during the tour of the works, gave proof of a surprisingly wide knowledge of industrial matters, as well as of a desire to become familiar to as great an extent as possible with the particular processes carried out at Beckton.

Then there was the perfect smoothness with which everything passed off from start to finish. In so long and varied a programme there was not a single hitch anywhere. Of all the big things connected with the Gas Light and Coke Company, the power of organization stands forth as one of the biggest. This power was tested on Saturday; and in the whole chain not a weak link was revealed. This fact is the greatest reward, as its statement is the greatest compliment, that could be bestowed upon those, from top to bottom, who had part in the making of the arrangements or in the carrying of them into effect.

The World's Largest Gas Company.

It will be a source of intense satisfaction to the gas industry generally to note the honour that has, by this Royal visit, been done to the largest undertaking not only in this country, but in the world—for that is the proud position held by the Gas Light and Coke Company, with its area of 265 square miles, extending from Windsor Great Park to Epping Forest. To provide the gas required for this area, 2½ million tons of coal are carbonized in a year, and, in addition to the gas yield, among other things 1,850,000 tons of coke, over 120,000 tons of tar, and 20,000 tons of sulphate of ammonia are produced. Some 18½ million gallons of oil are used annually in the manufacture of carburetted water gas.

The number of fires, cookers, water heaters, and such like, let out on hire by the Company is increasing at the extraordinary rate of 80,000 a year. Other big figures in connection with the Company are the following:

Yearly output of gas	235,000,000 therms
Record output for 24 hours	1,070,000 ,,
Capacity of the largest holder (Beckton)	8,000,000 c.ft.
Length of gas mains	3,700 miles*
Consumers	1,250,000
Gas cookers, fires, &c., let on hire	1,000,000
Number of men employed	19,000†
Pennies are inserted in the Company's slot meters at an average rate throughout the year of about	100,000 an hour.

* Equal to nearly half the diameter of the world. In addition there is the very large mileage of service pipes to consumers' premises.
† 4000 are employed at Beckton.

The Beckton Works can make 500,000 therms of gas in 24 hours.

"Patents for Inventions."—To mark the completion of forty years' practice in the profession of a Registered Patent Agent, Mr. B. J. King, Managing Director of King's Patent Agency, Ltd., has re-issued his well-known handbook, "Patents for Inventions," in a new and fuller form. The booklet, besides treating on patents, deals with trade marks and designs.

Naphthalene Scrubber at Baltimore.—A naphthalene scrubber built by the Bartlett-Hayward Company at the works of the Consolidated Gas, Electric Light, and Power Company of Baltimore is described by their Chief Chemist (Mr. M. C. K. Jones) in the Company's magazine. The shell of the scrubber is divided into seven compartments, in each of which a cup revolves. These cups are mounted on a central vertical shaft which is 40 ft. long and 13 in. in diameter, and which weighs 10 tons. The shaft is supported by a ball thrust bearing at the top, and is guided by another ball bearing at the bottom; and it is driven by a 60 H.P. electric motor through a worm gear reduction. The gas oil which is used as the scrubbing liquid is drawn-up on the inner surfaces of the cups, and sprayed by centrifugal force in a fine mist which scrubs the naphthalene from the gas. The oil is subsequently used in the process of gas manufacture.

Alcohol Motor Fuels.—As the Queensland Government, the Distillers' Company, Ltd., and others are starting a number of plants for the production of alcohol from molasses and starch-bearing crops in Queensland, for incorporation in a motor fuel in which alcohol will form the major portion, the records of some trials with such mixed fuels to be given at the forthcoming Congress of Chemists in London will be of practical interest in view of the fact that the German Government have recently put upon the market a fuel of this nature. Last year about 80 p.ct. of the world's records were obtained on fuels containing alcohol. Mr. Tizard, of the Department of Scientific and Industrial Research, at a recent congress on fuel, estimated that, if the engines of this country were altered to work on 6½ to 1 compression, it would result in a saving of many millions of pounds per annum. With existing fuels this alteration cannot be made; but with alcohol as a constituent, it may become possible.

ELECTRICITY SUPPLY MEMORANDA.

FOUNDED in 1904-5, the members of the Electrical Contractors' Association have seen many changes in the electricity industry, and one of them is that for the first time their organization has held a conference, which is to become an annual event. The conference was in Brighton; and the President was Mr. T. E. Alger. His address to a large extent was historical. It carried his hearers back to the days when far-sighted men among the electrical contractors banded themselves together and established the Association. They foresaw that many things might occur inimical to their interests; but they did not unite themselves into a solid body only for defence, but for insisting upon recognition, and for voluntarily taking part in progressive work for the benefit of electricity supply generally. Among the possibilities foreseen was that local authorities, having such large interests in electricity supply, might bring about developments which would result in superseding private enterprise in the installation of electrical equipment. In this there is no doubt that the founders were right; for during all the years subsequent to the birth of the organization there has been continual wrestling between it and the municipal authorities in respect of supremacy over wiring and selling. For many years victory was on the side of the electrical contractors. But times and ideas are constantly changing; and in the political world of Westminster the view has latterly gained ground that, for the greater development of electricity, the hands of the owners of the supply undertakings must not be tied to the same extent as they have been in the past. Wisely the Electrical Contractors' Association recognized this change in the political point of view, and prudently decided that a friendly compromise would be much better than the uncertain issue of continued conflict. It was pointed out in the "Memoranda" last week that a clause has been agreed between the Association and the Incorporated Municipal Electrical Association, which will henceforward be adopted in Private Acts or Orders of electrical undertakings, if it cannot be incorporated in the Electricity Supply Bill which the Government are now doing their best to pilot in some shape or other through Parliament. We gather from the proceedings at the Brighton conference that it is considered that the clause is in keeping with the times, and will be a lasting benefit to the whole electrical industry. The agreement certainly relieves the strain that has existed between the contractors and municipal authorities engaged in electrical trading. Another step which it is hoped will be effected is the complete registration of competent electrical contractors, and that such registration will be made compulsory, together with the carrying-out of work under a definite code of rules. The mere fact that a register of contractors was started some time ago by the Electrical Contractors' Association, with the view of eliminating inefficient and incompetent contractors, lends weight to the argument of municipal authorities that infinite damage has been done to the electricity supply industry through there being no control over those contractors whose work is of the cheap, shoddy, and inefficient order, which means increased danger. However, it is clear that the contractors themselves desire to raise the standard of work upon which they are engaged; and evidence of this was afforded in more than one discussion during the proceedings at the conference.

"E.C.A." Launch Out.

Co-operation.

It was seen, for example, in a paper by Mr. W. Finlay, who is the Secretary and Solicitor to the Electrical Contractors' Association of Scotland. The contribution was on the subject of co-operation between electricity suppliers and contractors. In it he held that the contractors and the suppliers of electricity were interdependent and not competitive; and therefore neither should endeavour to encroach upon the other's business. He claimed for the contractors that they were the first to come upon the scene, and provide private installations whereby the suppliers of electrical energy could do business, and that the contractors made considerable strides in the laying of the foundations to such business before the supply authorities began to think that they were more capable of doing the work themselves. Naturally in the early days, the contractors only possessed rudimentary knowledge; but, with passing time, those who were really competent in the craft acquired the right to be known as specialists. What has been done is too far advanced for the annexing of the installation contracting business by local authorities. It is now a question of co-operation, which, while giving new business to the contractors, will with each installation procure for the suppliers of electricity an extended and continuous consumption. In the discussion on Mr. Finlay's paper, several electrical engineers pointed out how beneficial such co-operation had been to their individual undertakings. Mr. J. Christie, the Electrical Engineer of Brighton, bore testimony to the advantages of such co-operation. When he went to Brighton twenty-six years ago, the annual output was something under 2 million KW.-H.; but this year it was more than ten times that amount. He attributed this to the cheapness of supply and to the whole-hearted co-operation of the contractors.

Wiring Regulations.

We all have good recollection of the big discussions there have been from time to time over the wiring regulations of the Institution of Electrical Engineers. A strange point about the controversy is that the strongest opponents have been the suppliers of electricity, while the contractors for wiring and apparatus have been distinctly favourable to working to the rules, inasmuch as they appreciate that inferior and defective work affects detrimentally their reputation and interests. This being the reason for their support of the rules suggests that those who are hostile to them think less of reputation and interests than of securing customers for electricity, though accomplished by the aid of cheap and low-grade installation. Mr. Ll. B. Atkinson contributed to the proceedings at the Contractors' Conference a paper on "The Need for Standard Wiring Rules." A leakage of electricity is not visible to the eye, nor can it be detected by the olfactory organ; and therefore a great amount of care is needed in installation. Hence the early recognition of the need for the regulation of installation work. Mr. Atkinson maintains that, as the Institution rules stand, there can be no real objection to them; and as to the cost of obeying them, the evidence of recognized contracting authorities is that—short of having no rules at all, and allowing almost anything to be done—they involve no serious addition to expense. As a matter of fact, in certain cases costs are actually lower relatively to the older sets of rules. However, experience emphasizes the need for the regulation of electrical installation. From the points of view of the protection of the consumer, the saving of the work of designers, architects, and specifying authorities, and the cheapening of installation material, the rules, in effect, must produce a standardization which will contribute not only to a high class of work, but to general economy. This is much better than each supply authority having its own special set of rules and specifications for doing the same class of work. In the discussion it was noticed how thoroughly the electrical contractors agree that the rules are essential. For example, Mr. W. R. Rawlings asserted that some of the severest critics of the rules had obviously not even read them. Satisfaction with them was expressed by Mr. H. J. Cash, who also stated that those who had investigated the question were convinced that the rules did not increase the cost of installation. Again, it was thought by Mr. H. Moss that an effort should be made to insist on central station engineers adopting the rules; and he agreed with one set, designed to give a reasonable minimum of safety, being applied to all property. There were other speakers who considered that the rules should be made compulsory, with the view of eliminating inferior work in future. Some considered that a further step should be taken, and that a form of compulsion should be applied to make the rules obligatory. At the present time there is nothing compulsory attached to them, and a point was made which has been suggested in the "Memoranda" on previous occasions, that insurance companies and municipal authorities should both look into the question of the enforcement of the rules—the former by refusing to insure property in which there is an electrical installation unless it faithfully complies with the rules, while the latter could undertake to do much by incorporating electrical installations in their building by-laws.

An Offer and the Refusal.

The Hastings Corporation, or rather their Housing and Improvements Committee, have persisted in the "dog-in-the-manger" spirit over the offer of the Hastings and St. Leonard's Gas Company to pipe the new White Rock Pavilion free of cost to the Corporation, in order that dual means of lighting, heating, and cooking might be available in the event of accident, or, in respect of cooking, of preference on the part of caterers for the service of gas rather than of electricity. It will be remembered that the offer has been pending for some time, and was, at a previous meeting of the Council, referred back to the Committee for re-consideration. They have since reported, and the report has been accepted by the Council, that the architects are satisfied that a secondary system of lighting by means of an electric circuit off storage batteries will suffice, and they consider it is preferable to secondary lighting by gas. With this Dr. Oscar Faber, the Constructional Engineer for the Pavilion, agreed. It was therefore recommended that the Gas Company be thanked for their offer, and be informed that the Council are unable to see their way to accept it. A more feeble report on such a subject could not have been presented. The Gas Company were not much concerned about secondary lighting, although no one can dispute that there would be greater reliability in a secondary system by gas than by electricity off storage batteries; and in such public places the provision of the highest pitch of lighting reliability should be regarded as an obligation by any local governing body. What the Company had chiefly in mind is the other uses to which gas can be put with far greater economy

and efficiency than electricity. The action of the Committee is the best evidence possible, in view of the Company's offer to do the work free, that the Electricity Committee are afraid to allow the caterers for the Pavilion to have the option of utilizing gas or electricity. They did not wish to run any risk. This testimony to the knowledge of the Electricity Committee of the superiority of gas should be of considerable value to the Gas Company. Small wonder the Housing and Improvements Committee were unable to see their way to accept the offer.

The Autumn Push. In the "Memoranda" on June 30, reference was made to the autumn lighting campaign which is going to be waged jointly by the Electrical Development Association and the Electric Lamp Manufacturers' Association. Regarding it, some additional information was given by Mr. J. W. Beauchamp, Director of the "E.D.A.," during the discussion on Mr. Finlay's paper. He asked the contractors to give the strongest possible support to this effort to promote domestic electrification throughout the country. His estimate of the cost of this push is £30,000, which, he says, is £10,000 more than the amount usually available annually for the campaigns of his Association. On this occasion, however, the "E.L.M.A." have added their winter allocation to that of the E.D.A., which enables the more spirited adventure. From November to April, displayed advertisements will be inserted in newspapers at a cost of approximately £20,000; and then there is to be a public competition. A further suggestion is that contractors should set up local committees for running all-electric houses during the campaign. It is the view of Mr. Beauchamp that the normal connection of houses to electric cables should, through this special effort, be doubled within the next eighteen months.

Inclusive Flat Rates. It is no use electricity undertakings playing about with fixed rates, seeing that every fresh venture in this direction only brings the operators to the same conclusion—that in one way or another they are "done." This has been found particularly in connection with fixed prices for lighting. Estimates have been made which electrical engineers consider are ample to cover the consumption of the consumers in view of the number of lamps in use of given capacity. But over and over again they have found that the consumers, when starting on the new lighting career, are fairly frugal; then gradually—it is only human nature—they become more careless; and eventually extravagance takes the place of the initial economy—thus making the fixed price a non-paying one. The Woolwich Borough Council, who have been extraordinarily enterprising in trying to develop electricity business, gave the tenants of Council houses the opportunity of taking, for lighting and electric cooking, electricity at a flat rate of 2d. per KW.-H. For lighting 2d. per KW.-H. is a price which anybody would regard as a modest one; but when it comes to cooking, tenants of such houses who have not deep pockets would regard 2d. per unit as a most expensive method. We are not surprised, therefore, to learn that the consumers use the twopenny units for lighting purposes, but do not employ the cookers. The Chairman of the Electricity Committee (Mr. Councillor Davis) states that, so far as they have been able to ascertain, this only applies to one house! If this is so, why is it that a new tariff is contemplated "which will obviate this and other anomalies?"

MAINTAINING UNIFORM QUALITY.

Coke Oven Gas and Water Gas Mixture.

Several years ago an exhaustive investigation was undertaken by a Committee appointed by the Public Service Commission of Maryland for the purpose of determining what calorific value gas could be most economically distributed to the city of Baltimore. As the result, 500 B.Th.U. was the figure decided upon; and the Consolidated Gas, Electric Light, and Power Company of Baltimore were ordered to furnish a gas having a monthly average total heating value of not less than 500 B.Th.U. per c.ft. At no time was the figure to be lower than 490 or higher than 520 B.Th.U. The Company use every endeavour to keep the value constant at all times on the 500 B.Th.U. mark; but in this connection problems have presented themselves, as pointed out by Mr. John H. Wolfe (Superintendent of Gas Manufacture) in the official magazine of the Company.

For more than twenty years past the Company have taken the excess gas from the coke ovens at the Sparrows Point plant of the Bethlehem Steel Company, some 13 miles away from the Spring Gardens Station of the Baltimore Gas Company, where it is mixed with the water gas manufactured at the station. It is in the mixing of the coke oven gas and water gas, and in the adjusting of the heating value of the carburetted water gas to equalize the inequalities in the heating value and volume of the coke oven gas that a difficult gas-manufacturing problem has been found to lie. Until recently calorific value tests were made hourly, day and night, of the two primary gases and of the mixed gases; but now Thomas recording gas calorimeters have been installed at various points on the Spring Gardens manufacturing plant. There are in all seven of the instruments employed.

THOMAS RECORDING CALORIMETER.

The principle upon which this calorimeter operates is that of absorbing the heat generated by the combustion of a known quantity of gas in a known quantity of air. The rise in temperature of the air is determined by means of electrical thermometers which indicate and record directly the B.Th.U. value of the gas. The recorder is a separate instrument from the calorimeter body, and may be located at any convenient point. At Spring Gardens the place selected is the office of the gas generator foreman, who is thus able to keep himself continuously informed of the heating value of the various gases, and to adjust manufacturing operations accordingly. In order to secure the correct samples for the calorimeters, a rapid flow of gas is maintained from the sampling points through individual lines, past the calorimeters into a small holder. Each calorimeter draws a portion of the gas for test from its respective sample line. The excess gas which flows into the holder is periodically returned from it to the gas system by means of a small motor-driven compressor, which is actuated by automatic controls. On two of the calorimeters additional equipment has been installed to operate warning signal lights in the technical office at the service building, as well as in the valve house. Thus, red signal lights warn the supervisors in the technical office and the operators in the valve house if the heating value of the gas drops below 495 B.Th.U. Should the heating value of the gas distributed to the city rise above 515 B.Th.U., a green signal light is shown; while if the calorific value is satisfactory there is a white light. Thus the limits set for themselves by the Company are narrower than those imposed by the Public Service Commission.

The calorimeters are given careful attention daily; and at regular intervals heating values are checked by means of Junkers hand calorimeters, so that the accuracy of the equipment is maintained.

Institution "Transactions," 1924-25.

We have received from Mr. Walter T. Dunn, M.I.Mech.E., F.C.I.S., the Secretary (by whom it has been edited), a bound copy of the "Transactions" of the Institution of Gas Engineers for the year 1924-25. The volume is even larger than its immediate predecessor—comprising, as it does, with the lists of members, &c., some 750 pages. Its main feature, of course, is the report of the successful annual general meeting, which was held at the Institution of Civil Engineers, in June, 1925, under the Presidency of Mr. J. Ferguson Bell, J.P., M.Inst. C.E., of Derby; but there is also much else of interest. There is the thesis on "Coal Gas Condensation" submitted by Mr. T. H. Prater, of the Tottenham District Light, Heat, and Power Company, in connection with the Institution's Diploma Examination in Gas Engineering; and Mr. A. V. Hendrickson has contributed his customary useful abstracts of papers relating to gas manufacture. There are memoirs of a number of friends who have passed away—among them, Mr. H. E. Jones, Mr. H. D. Ellis, Dr. Hans Bunte, and Captain Riall Sankey. Mr. Jones, of course, was a Past President, while Dr. Bunte and Captain Sankey were honorary members.

Rubber Rings for Pipe Joints.

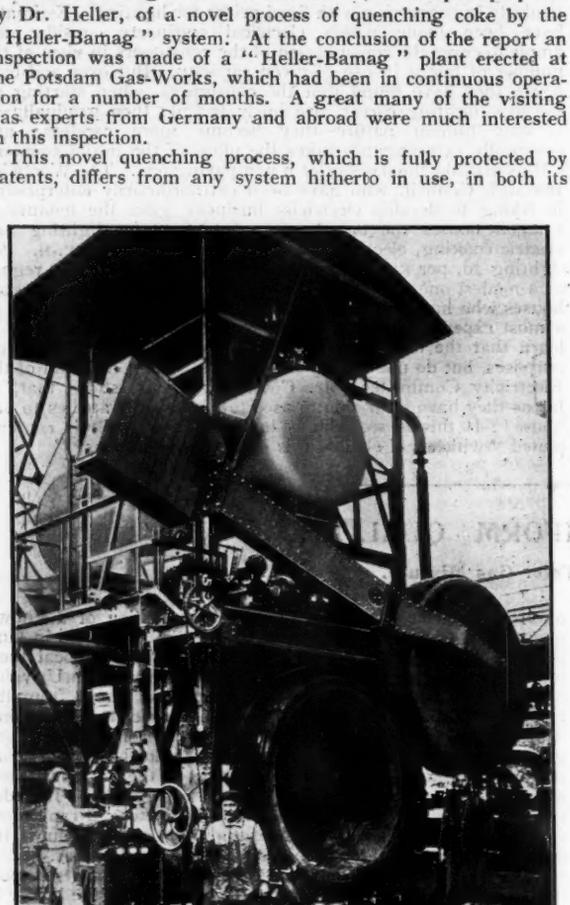
In the course of a report on "The Use of Vulcanized Rubber Rings in Bell and Spigot Gas Joints," presented at the annual convention in the United States of the South-Western Public Service Association, the following experience at Galveston (Texas) was related, concerning a 4-in. bell and spigot cast-iron gas line that had been installed in 1913, with "Leadite" joints, and this year was moved. As the old joints were in bad shape, they were thoroughly cleaned out and re-made by packing first with braided jute to within 2 in. of the face of the bell, secondly by inserting a rubber ring, and lastly by filling-up the joint with molten lead. This lead was simply poured on top of the rubber ring, and in the case of twelve joints was not caulked. These twelve joints, when tested with gas at approximately 4 oz., showed six to be leaking. They were left uncaulked, and after a period of 24 hours only two of the six joints were found to be leaking. These last two joints were self-sealed by the gas, and all of the joints were absolutely tight, at the end of 36 hours. This experience seemed conclusive proof that the rubber rings in bell and spigot joints cause them to be self-sealing.

"HELLER-BAMAG" COKE QUENCHING SYSTEM.

[Communicated.]

On the occasion of the recent meeting in Berlin of the Markischer Verein der Gas- und Wasserfachmanner, detailed information was given for the first time, in a report prepared by Dr. Heller, of a novel process of quenching coke by the "Heller-Bamag" system. At the conclusion of the report an inspection was made of a "Heller-Bamag" plant erected at the Potsdam Gas-Works, which had been in continuous operation for a number of months. A great many of the visiting gas experts from Germany and abroad were much interested in this inspection.

This novel quenching process, which is fully protected by patents, differs from any system hitherto in use, in both its method of operation and its external appearance. Up to the present it has been the general practice in gas-works and at coke oven plants to quench incandescent coke with cold water. The structure of the coke, however, is injured by this rapid cooling-down with cold water, and the effect of the explosive action of the steam is to make a considerable amount of small coke, all of which means a certain reduction in the value of the coke produced. In the "Heller-Bamag" process the incandescent coke is quenched inside a steam-tight chamber by a spray of highly superheated water.



"Heller-Bamag" Coke-Quenching Plant.

The vapours in the quenching chamber, produced by this treatment of the coke, are under high pressure, and comprise steam and water gas. As there is no immediate use for these vapours, they are employed as a heating medium for the production of high-pressure live steam in a steam generator. By this means the greater part of the steam is condensed; and as a bye-product of the plant a certain amount of pure water gas is gained, the value of this being greater than that of the steam.

As may be seen in the illustration, the plant consists of a coke quenching chamber above which a steam generator is arranged. The illustration also shows the plant with the cover opened; and this cover can be closed in a few seconds by means of an electric drive. At the side of the plant are conveniently assembled in one place the switch apparatus and control gear enabling one man to operate the entire plant.

Among other advantages of the "Heller-Bamag" process, it should be particularly noted that the coke goes through the whole quenching process, until discharged for separation, in the steam tank in which it is received from the ovens. Consequently, the formation of a considerable quantity of small coke by the falling and crushing incident to other methods is obviated. By the "Heller-Bamag" process, certain physical conditions result which are of value. The coke can be obtained with a pre-determined moisture content; and the sieve analysis shows that the formation of small coke is reduced to a trifling percentage.

The coke leaves the plant at a temperature of about 100° C., and is in appearance like aluminium. As a result of the treatment of the incandescent coke with high-pressure steam, the sulphur content is reduced. The whole process takes place in a steam-tight quenching chamber, and so is hygienic; there being no large quantity of dust and vapours developed.

The duration of each quenching period is some 15 minutes. The capacity of the plant can be adapted to the requirements of the largest works. It operates economically, and in most cases quickly amortizes the capital investment. It can be arranged in existing works, as it requires little space.

The advantages of the "Heller-Bamag" process can be summarized as follows:

(1) The many uses of the high-pressure steam produced by the heat contained in the incandescent coke.
(2) The production of water gas.
(3) The considerable improvement in the quality of the coke as to both its size and structure, and its freedom from sulphur.
(4) The ability to adjust the percentage of moisture content in the quenched coke.
(5) The production of the coke under conditions which are dustless and hygienic.
(6) The small amount of space required by the plant.
(7) Its low initial and operating costs.

Plant according to the process described is manufactured by the Bamag-Meguin Aktiengesellschaft, of Berlin, under the patents of the inventor, Dr. Heller, and distributed in British territory by Messrs. Bamag-Meguin (Great Britain), Ltd., of Broadway Buildings, Westminster, London, S.W.

Large Main Welding Job.

A gas company at Portland (Ore.), says "Oxy-Acetylene Tips," recently completed the making and laying of 3 miles of 30-in. and 4 miles of 24-in. steel piping. This piping was carried across the continent in the form of flat sheets $\frac{5}{16}$ in. thick and 12 ft. long, and was rolled and welded at the point of use by the oxy-acetylene process. Each sheet was first welded longitudinally, and then three of these units were welded together. With this done, the 36 ft. lengths were tested at a hydrostatic pressure of 150 lbs. and then with air at a pressure of 50 lbs.—soapy water being painted over the welds, and the few pinhole leaks being closed by caulking. After the pressure test, the sections were passed successively through a series of dipping tanks containing, respectively, a hot alkali solution to remove the grease, a hot dilute sulphuric acid to clean off scale, an alkaline neutralizing bath, and a hot-water rinse. Drying by means of gas flames, played on the inside of the pipe sections, completed the preliminary treatment. Before welding the units together, each pipe length was capped at both ends, dipped in asphalt, and rolled in grit; the caps serving to prevent the asphalt from getting inside, and also to keep the ends free from grit, &c., to facilitate welding. Three 36-ft. lengths were placed upon trestles and welded before lowering into the trench. The longitudinal seams were alternately offset 14 in. from one another, and were all on top within easy reach.

"T.I.C." Plant at Joliet.—Reference is made by the "Gas Age-Record" to a "T.I.C." (Woodall-Duckham) plant recently put into operation at the works of the Coal Products Manufacturing Company, Joliet (Ill.), for the purpose of continuously distilling water gas tar and producing therefrom several fractions, with pitch as a residue. The installation is fired by gas on the surface combustion system, as supplied by British Furnaces, Ltd. Although, says our contemporary, the unit was designed to treat only some 20 to 25 long tons of tar per twenty-four hours, having a water content not exceeding 8 p.ct., it proved, on its test run of some ten days' duration, to be capable of handling 24 long tons of water gas tar per twenty-four hours, the tar containing an average water content of 14 p.ct., at times rising to as much as 30 p.ct. In spite of the heavy and varying amount of water in the tar, the installation worked quite smoothly, with no indications of priming or frothing. A very hard pitch was obtained throughout the test, 52 p.ct. of the original tar being volatilized.

GAS-FIRE FLUES.

Co-Operation with the Builder.

Any builder who pays a visit to the showrooms of any progressive gas undertaking can see for himself that, with modern gas fires, it is not only possible, but easy, to combine the beautiful with the practical, the economical, and the convenient, and that this is especially easy if the designer, builder, or re-constructor of houses will do his part by providing from the outset for modern gas fires instead of for the obsolescent coal grate which has to be hidden by, or displaced by, a gas fire installed as an afterthought. There is not the slightest doubt that the architect and the builder can help the housewife to solve at one and the same time the pressing problems of a peaceful atmosphere within a beautiful house—through the abolition of the dirt and drudgery which inevitably attend the use of coal fires—and of a purified atmosphere without—through the abolition of smoke.

It is not necessary to emphasize here the value of co-operation between the gas industry and the building profession, but it may not be out of place to draw attention to the arguments which should convince the architect or builder that he is well-advised, and serving the interests not only of the community, but also of himself, to make provision for gas heating equipment.

The Question of Cost.

The main argument, needless to say, is that affecting cost. Eminent architects have estimated the saving to be effected by the use of special gas flues at as much as £10 per room, for their adoption eliminates the chimney breast and the concrete hearth—thus allowing the joists to run straight through without "trimmers"—and at the same time, of course, increases the available floor space. In the Liverpool Corporation housing schemes over 20,000 gas fires were installed with "Economy" flues, thereby effecting a saving of over £100,000. We know of one building where, by the use of 25 of these flues, 43,000 bricks were saved, 2761 c.ft. of extra room space secured, and 280 sq. ft. of extra floor space obtained. It should certainly be the policy of gas undertakings throughout the country to point out that a wider range of design is opened-up to the architect immediately he is able to instal the fireplace at any position in any room, irrespective of the location of those in the rooms above and below. In these labour-saving days, it is a point of some weight that, in the absence of a projecting chimney-breast, work is saved in connection with skirting, cornices, and picture rails. Fewer corners, moreover, mean fewer dust traps.

Actual Figures.

The following figures, which are based on a pair of artisan dwellings recently built, will perhaps illustrate more definitely the actual savings to be attained by installing Nautilus "Economy" gas flues, as compared with the ordinary 9 in. by 9 in. brick flues.

—	Additions.	Omissions.
	£ s. d.	£ s. d.
Excavator and concretor	0 6 0	3 4 3
Bricklayer and mason	41 6 2	104 2 3
Carpenter	4 17 0	2 3 11
Smith, plasterer, plumber, and painter	63 16 3	63 6 10
	£110 5 5	£172 17 3

Savings: £62 11s. 10d.

The above figures include all fixing and materials, also the gas grate complete, to replace the coal grate. It will be noticed that the economy starts from the foundations of the houses, as no footings have to be excavated for the various hearths, with the exception of the living room, which is fitted with a coal range.

A Note of Warning.

The gas industry has pointed out to the building industries the great savings which can be effected by making provision for gas fires instead of coal fires; and it cannot be denied that this aspect of the matter has in some instances so impressed the speculative builder that he provides totally inadequate means of exit for the products of combustion from gas-consuming appliances. Recent cases have been brought to light where glazed earthenware pipes of sizes varying from 3 to 5 in. in diameter have been run up in the corner of the room, and discharged into an air-brick through an outer wall. In one instance it was found that the space provided in the brickwork for the air-brick was also used to carry one end of a beam, with the result that the open end of the flue pipe beneath was partially covered, and the aperture for the air vent practically filled up, by the beam end itself. In a paper by Mr. E. L. Oughton before the Midlands Salesmen's Circle last month he mentioned that his Company—the South Suburban Gas Company, of which he is Sales Superintendent—had complaints from some new houses that the gas fires supplied and fixed by the builder were "smelly," and that the flames sometimes blew back into the room. Upon investigation it was discovered that in one case two 8-in. fires were connected into one flue consisting of 2-in. drain pipe terminating in a cavity with an ordinary air grate. In the other case, the flues were properly built, but improperly terminated. The question of picking up the products from a gas fire is of vital importance; and it is questionable whether round flue pipes of the types mentioned could ever be regarded as satisfactory.

Correct termination of a flue is of the utmost importance. It is wrong to finish a flue of any type with an ordinary 9 in. by 9 in. air-brick; the total unobstructed ventilation so provided is inadequate, and there is great liability to down draught, particularly when a heavy wind pressure is prevalent on the side of the building through which the outlet is taken. If, on the other hand, the flue is taken through the roof, and finished off with (say) a cone cap, the cold air outside the exposed portion of the pipe renders the flue inoperative as a foul air extractor.

Sufficient has been said to show that inadequate and improperly fixed flues are bound to react on the gas industry. However efficient the gas fire may be in itself, it can only cause dissatisfaction in such circumstances.

"Economy" Flues.

We have dealt with the evils of purposeless, ill-constructed flues. Let us now consider the remedy. The "Economy" cast-concrete flues that are manufactured and were designed by the Nautilus Fire Company have been on the market for some years. Careful consideration has been given to the over-all dimensions, to facilitate their being built-in with ordinary brickwork. More important, however, from the gas industry's point of view is the size of the flue area provided by the "Economy" flue. After exhaustive tests, the following areas were arrived at as being most suitable: For gas fires up to 11½ in. wide, 24 sq. in.; for fires 13 in. wide, and over, 37½ sq. in. These areas are sufficient not only to carry away the products of combustion from the fire, but also to afford adequate ventilation of the apartment, equivalent to an air change of certainly not less than three complete changes per hour. It is interesting to note that the small-size "Economy" flue can, if required, be supplied in a double pattern for use in cases where two flues are backing on each other. The advantages the double type has over the single, in instances where its employment is practicable, need not be laboured, for one operation to build a pair of flues is clearly less costly than the separate construction of the two. There is also a saving in the cost of the flue blocks themselves.

A Weighty Argument.

"Economy" flues are often used for ventilation purposes only; and even though some means of heating other than by gas has primarily been decided on when the house is being built, it is certainly in the interest of the gas industry to influence the builder to instal this flue system. Arguments in favour of gas heating must sooner or later prevail; and it will prove of material assistance if it can be explained that the flues are ready for the fixing of a gas fire.

It should, of course, be borne in mind that gas flues form a permanent part of the house, and will be expected to last as long as the house itself. Therefore, the materials of which the flues are constructed have been given every consideration by the Nautilus Fire Company. Tests covering long periods have been carried out with various materials; and up to the present nothing better has been found than cast concrete. Needless to say, attention is paid to the quality of the cement used, and the proportion in which it is mixed with the sand to produce the correct aggregate. Waste material from gas-works would not be satisfactory.

Conclusion.

Endeavour has been made in this article to point to the value of co-operation between the gas industry and the building industry. It has been shown how the latter benefit by the installation of gas flues, but how, if they carry the policy of economy too far, they can injure the future of the gas heating load. This latter consideration points to the real need for those in responsible positions in the gas industry to take more than a passing interest in the whole question. There have recently been published the results of an investigation, conducted by Mr. I. Vernon Brumbaugh, of the United States Bureau of Standards, into the causes of accidents from gas appliances. One of the conclusions drawn from the work is that it requires a specially trained person to determine by inspection when appliances are properly installed, correctly adjusted, and in a condition to operate efficiently. If systematic inspection of all gas fires were provided—and by this we mean inspection of the functioning not only of the fire itself, but also of the flue—there is no doubt at all that complaints about "smelly" fires would dwindle away, and the gas heating load would develop at an astonishing rate.

PROGRESS OF APPLIED CHEMISTRY.

Reports Issued by the Society of Chemical Industry.

Volume X. of the Reports of the Progress of Applied Chemistry, issued by the Society of Chemical Industry, makes interesting and very valuable reading. It is not merely desirable, it is essential, that all those who wish to keep in touch with progress in the various fields of chemical industry should acquaint themselves with the contents of this volume. Of the twenty-three sections of the book, at least five—the general section, and those on fuel, gas and destructive distillation, acids, and refractories—closely concern the gas industry. What follows is chiefly comprised of interesting excerpts from these sections.

The contributor of the general section is S. M. G. Ure, M.A., B.Sc., M.I.Chem.E., who has a good deal to say on the development of the nitrogen fixation industry. He mentions that, at Billingham, Synthetic Ammonia and Nitrates, Ltd., have undertaken extensions which will bring the output of ammonia to 200 tons a day. This firm have also turned their attention to the production of ammonium nitrate. In the United States, the Lazote Incorporated have put up in connection with their fixation factory a complete gasification plant capable of producing 8 million c.ft. of gas per day. Throughout the year, he states, steam raising and electrical power plant have aroused widespread interest. Boiler efficiencies as high as 94 to 95 p.ct. over short periods have been attained, while a continuous running efficiency of 90 p.ct. is practically certain. Pulverized fuel is one of the methods of firing adopted; and in America boilers having a heating surface of over 2½ million sq. ft. are either in course of construction or are being fired in this way. In America a plant is being erected for the low-temperature carbonization of the pulverized fuel before its admission to the boiler furnace. In this plant—the McEwen-Runge, to which reference has been made from time to time in the "JOURNAL"—the finely-powdered fuel falls down two vertical retorts placed one above the other. It will be capable of treating automatically and continuously 200 tons of fuel per 24 hours. Mr. Ure mentions that at the Glasgow Corporation Chemical Works new tar plant of an experimental character has been installed. This includes a Woodall-Duckham still and a Foster heater; and it is intended to use new methods of distillation to ascertain if the yield of pitch can be minimized.

"Researches on coal constitution, hydrogenation, synthetic liquid fuel production, and so on, which would formerly be regarded as being only of academic interest," states E. C. Evans, who is responsible for the fuel section, "are now being followed closely by British industrialists, not only from the point of view of their ultimate bearing on the national utilization of our fuel resources, but from a realization of the light they throw on current problems in our various producing districts." Mr. Evans draws attention to the interest which has been taken in coke production during the year. He records R. A. Mott's tentative theory that the formation of coke involves wetting phenomena, and that the strength of the coke depends not only on the character and proportion of the fusible constituents in the coal, but also on those of the infusible material. The more easily the infusible constituents are wetted, the stronger the coke. In the light of this theory, remarks Mr. Evans, an explanation is possible of the improved results that are obtained with some weakly coking coals when coke breeze is added to the coking coal prior to carbonization. Though the proportion of binding material is reduced, yet the addition of the coke breeze gives a higher proportion of material which is more easily wetted, and thus results in a stronger coke.

Mention is made of the work of R. Lessing, and of C. B. Marson and J. W. Cobb, which has shown that the character of the inorganic constituents in coal has a profound influence on the character and structure of the resulting coke, and that ash analyses throw a light on results that have previously been found difficult to explain. Coal blending has received considerable attention; and in one trial it was demonstrated that the carbonizing period could be reduced from 30 to 20 hours by suitable blending. On the question of coke preparation, Mr. Evans suggests that one of the most interesting developments has been the inauguration of dry cooling of coke at Homecourt. He calls attention to the fact that careful sizing of coke improves the product considerably as a domestic fuel—a fact which was well indicated in the Coke Competition papers. It is stated that at one coke-oven plant in this country two-thirds of the coke is broken and carefully screened for domestic, horticultural, and other fuel; the remaining one-third being sold for foundry and furnace purposes. This is a point which readers will doubtless note carefully. Mr. Evans is of opinion that, in view of American practice with natural gas, there should be no insuperable technical difficulties in distance transmission of gas of high calorific value—on which point Mr. Harald Nielsen, whose article in the "JOURNAL" for Feb. 10 created much interest, is in thorough agreement.

In reference to producer gas, there is described a novel development due to J. J. Deschamps, who has found that the combustion of fuels is stimulated by imparting vibrations to the air blast, and suggests that these vibrations, which should be as rapid as sound vibrations, should be imparted by sirens, whistles, &c. Perhaps in time the ideal stoker will be an engineer-musician. Mr. Evans records the development of the Benson boiler, in which the principle of converting water into steam under critical conditions of pressure and temperature is adopted; pressures amounting to 3200 lbs. per sq. in. being used at temperatures *circa* 375° Fahr. It is claimed that 30 to 35 p.ct. efficiency, coal to switchboard, could be established, instead of an efficiency of 20 p.ct. in some existing super-power stations.

The section on gas, destructive distillation, and tar products, is by J. G. King, B.Sc., Ph.D., A.R.T.C., F.I.C., who is Chief Chemist at the Fuel Research Station. He says that the modern tendency towards greater efficiency by the application of research to manufacturing processes is evident in the number of published papers dealing with methods of obtaining increased process efficiency or output. An outline is given of the work undertaken by the Fuel Research Board during the year; the results of the enrichment of gas during carbonization by the injection of oil at the centre of the retort being mentioned. Dr. King remarks that little is yet being done in the British gas industry on benzole recovery, while in France and Italy it is being made compulsory. The most interesting work of the year, he suggests, has been carried out by W. H. Hoffert for the Joint Benzole Research Committee of the National Benzole Association and the University of Leeds. On the subject of water gas production, the author draws attention to the work of W. A. Dunkley, who states that the use of bituminous coal in large generators is not so satisfactory as in small ones. The principal difficulty in the operation of the plant is due to channelling; and Dunkley suggests that the coal should be blended with from 20 to 25 p.ct. of coke.

Regarding gaseous combustion, Dr. King notes a careful investigation which has been carried out by R. T. Haslam, W. G. Lovell, and R. D. Hunnemann on the radiation from non-luminous flames. They find, in accord with Helmholtz and Callendar, that the radiation decreases for either less or more aeration than is theoretically required for complete combustion. In contradistinction to Helmholtz, however, they find that the amount of radiation bears no simple relationship to the nature of the end products of combustion or to the calculated flame temperatures.

In considering low-temperature carbonization, the author omits any reference to the "L & N" process, which is surprising. He thinks that, if successful modification of existing high-temperature carbonization plant or technique should result in a coke of sufficiently ready combustibility, the smokeless fuel problem would be more nearly in sight of solution. With regard to tar, mention is made of the fact that the cause, measure, and prevention of the corrosion of iron by tar oils has been the subject of research by K. Leo, who thinks that the damage is entirely due to ammonium salts; the tar acids being exonerated from blame. An item of interest regarding the problem of calorimetry is H. von Wartenberg's method of determining the calorific value of solid or liquid fuels. The fuel is burned in a stainless steel tube under pressure, and the expansion of surrounding toluene is measured. The accuracy claimed is ± 1 p.ct., and the time one-fourth of normal.

The section on acids and alkalis is by P. Parrish, A.I.C., M.I.Chem.E., and F. C. Snelling, of the South Metropolitan Gas Company, who state that Great Britain is now the second largest producer of synthetic ammonia in the world. As for sulphuric acid, plants have only operated at about 50 to 60 p.ct. of their normal capacity. If an 80 to 90 p.ct. load factor could be reached, acid prices would be reduced, and a ray of hope would permeate the sulphate of ammonia industry. The authors go on to say that the position as regards bye-product ammonia during 1925 was far from encouraging, and that the future cannot be regarded as other than gloomy. Synthetic ammonia production has introduced a factor which disturbs the former operation of the law of supply and demand. No longer can bye-product ammonia take the lead in the matter of prices. Few works manufacturing less than 750 tons of ammonium sulphate per year can operate profitably. Throughout the year there has been the problem of disposing of spent effluent liquor; and several undertakings have been compelled to suspend manufacturing operations, and dispose of gas liquor as best they could. Small wonder, therefore, that consideration is being given to the technique of the treatment of crude coal gas, not only with a view to the production of a less toxic gas liquor, but also in the hope of obtaining a more concentrated product, and thus reducing production costs. Pending

a reduction of acid prices, considerations will turn to possible substitutes for sulphuric acid; and in this respect the authors mention that the advantages of calcium sulphate have been urged. For similar reasons it is found that prominence has been given to the direct production of ammonium sulphate by bringing ammonia and water vapour into contact with sulphur dioxide and air.

The section on refractories is by W. J. Rees, B.Sc., F.I.C.

COTTRELL PRECIPITATOR FOR DETARRING GAS.

At the present time Cottrell electrical precipitation equipments for removing tar from gas, with a total rated capacity of approximately 250 million c.ft. of gas per day, are either at work or ready to be placed in operation. The installations range in size from a capacity of 6 million c.ft. of gas a day to 30 millions; and some of them have been in use for about a couple of years. Results that have been realized by plants in actual commercial operation, for the removal of tar fog from gas prior to its passing to the purifiers, were summarized by Mr. N. W. Sultzer (of the Research Corporation, New York), in a paper prepared for the New England Association of Gas Engineers. In the form of fog or mist, the tar is easily removed by the precipitator.

Mention has already been made in the "JOURNAL" of this method, which comprises, in the first place, an ordinary iron or steel pipe, (say) 6 in. in diameter and 9 ft. long. This pipe is placed vertically over a rectangular chamber into which the gas is led, and from which it flows upwards through the pipe. Down the centre of the pipe is a wire, with a weight at the bottom to hold it taut, supported from a framework at the top carried on insulators. A high-voltage uni-directional, or form of direct, current, is utilized. One high-voltage terminal is connected to the wire suspended in the pipe; while the other is connected through ground to the pipe. The high-voltage circuit is thus completed, except for the gap between the pipe and the wire. When the voltage is applied, a corona is formed around the wire, and the gas, becoming ionized, permits the flow of a slight current across this gap. The result is that the suspended particles entering this electrical field assume by induction an electrical charge, which repels them from the wire or pipe, depending on polarity used, so that they are driven out of the gas stream to the pipe or wire, where they collect. This material then, if in the form of a liquid—such as the tar and oil ordinarily encountered in gas manufacture—simply flows from the pipe and collects in the lower compartment; the operation thus being continuous. The number of pipes employed depends upon the volume of gas to be treated.

One installation (on producer gas) has been in use for some time reducing the tar content of the gas down to about 0·0059 grain per c.ft.; while another is completed to reduce the tar content to 0·00005 grain. The pressure drop is negligible.

IMPROVED METHOD OF HANDLING LAMPBLACK.

In a paper read before the Pacific Coast Gas Association, Mr. W. C. Hornberger (Assistant General Manager of the Central Arizona Light and Power Company) said that an economical and easy method of handling lampblack has long been a subject of discussion among Pacific Coast gas men. It is a matter of much importance to the average size crude oil gas plant, which is not large enough to dispose economically of its lampblack by briquetting. Because of this fact, these plants have no specially designed apparatus to handle this bye-product; and it is probable that in most gas plants of this character more money is wasted in the act of recovery than is represented by the value of the lampblack so recovered. With the idea of solving the problem, the author's Company acquired some land in the neighbourhood of their combined gas and electric plants, in order to erect thereon a lampblack disposal plant. Settling pits were dug, and a sewer was constructed to carry the lampblack and water by gravity from the gas plant to the pits. To facilitate cleaning, manholes were constructed 150 ft. apart for the entire length of the sewer. In due course the lampblack and water were turned into the sewer; but shortly afterwards all the covers floated off the manholes, and thick lampblack started to flow over the streets, while comparatively clear water passed to the pits. It then occurred to the Company that they had unintentionally formed a good separator in their sewer; and so a separator was built which had as a nucleus the idea of continuously scraping the lampblack from the surface of flowing water and lampblack. After experiments extending over two years, the apparatus resolved itself into a tank 10 ft. by 10 ft. and 8 ft. deep. At one end a baffle extends downwards to within 18 in. of the bottom. On the top of the tank is a series of scrapers on chains, like an endless belt, motor operated. The lampblack and water enter the side of the tank, and the lampblack rises to the surface and is dragged off by the endless belt of scrapers. The water passes out underneath the baffle, and flows either to the settling pits in the lower yard or to the sewer. Over 90 p.ct. of the total lampblack is separated from the water in this way. The lampblack when scraped forward into another compartment resembles thick mud. From this compartment it is fed on to a small filter, dropped into an elevator, and conveyed directly to the bins in front of the boilers for firing. Saving of space and labour are claimed.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Chalk Fuel Corporation, Ltd.

SIR,—In the prospectus issued by the Chalk Fuel, Power-Gas, and Bye-Products Corporation, Ltd., on which you recently commented, there is what purports to be a certificate (undated) of mine; and the Registrar of the Institute of Chemistry has very properly called my attention to it. I had difficulty in tracing any such certificate, but I find that in 1914 I gave one to another Company, certifying that six briquettes *described* as "chalk composition briquettes" had a calorific value of 9050 B.Th.U.—the figure appearing over my name in the prospectus—but in the certificate of 1914 I find I have added, what is here omitted, "the calorific value of coal ranges from 12,000 B.Th.U. up."

Immediately above what purports to be my certificate there is another (also undated), in which a Mr. G. H. Franklin, Engineer, says: "I estimate that one ton of your best chalk briquettes is equal to 1½ tons of average coal." It will be readily seen that, had my certificate of 1914 been given in its entirety, it would have amounted to a flat contradiction of what appears over Mr. Franklin's name.

Neither the Chalk Fuel Corporation nor the Company to which I gave the 1914 certificate had any authority to use my name or certificate in a prospectus or for advertising purposes. It may give a little humour to the situation if I add that the fee for the 1914 certificate still remains in my books unpaid.

WM. MCD. MACKEY, F.I.C.

Victoria Chambers,
South Parade, Leeds,
July 9.

Industrial Chemistry and National Progress.

SIR,—The vital importance of applied chemistry to almost every form of national industry, and its intimate relation to the stability and progress of British manufacturing processes, are, happily, widely recognized to-day by our industrial traders. From the point of view of keeping the research staff attached to industrial works in the closest possible touch with the latest developments, we venture to appeal to the heads of all industrial firms who employ chemical or other technical and scientific research staffs to provide facilities, and even inducements, to enable them to attend the forthcoming Congress of Chemists, which is being organized in London for the week beginning July 19 by the Society of Chemical Industry.

This Society (which has a membership of over 5000) is engaged with kindred organizations in the constant dissemination among chemists and chemical engineers of the latest results of technical and scientific research throughout the world. The London Congress will be a rare opportunity for enabling research and works chemists throughout the country to meet together for the exchange of views and experiences; and at several of the sessions opportunities will be given for hearing our highest authorities deal with problems of immense industrial and commercial interest, including such questions as corrosion, the development of alcohol motor fuels, the extraction of sugar from waste wood, modern chemical plant design and manufacture, the improvement of chemically resistant steels, irons, and alloys, the commercial production of such natural drugs as insulin, &c. In addition, there will be visits to a large number of works, illustrating the essential part which industrial chemistry plays in most of our commercial processes.

Employers whose organization includes research departments would, we feel sure, be serving their own interests and helping to maintain national efficiency and progress by giving their technical staffs access to the great advantages of such conferences, and by encouraging their personal association with the societies that are working to keep British chemical science and industry abreast of the latest theoretical and industrial advances.

W. J. U. WOOLCOCK, President.

Society of Chemical Industry,
London, July 7, 1926.

REGISTER OF PATENTS.

Controlling Combustion.—No. 252,450.

WHITE, A. E., of Chancery Lane, W.C. 2.

[A communication from the SURFACE COMBUSTION COMPANY, of New York.]

No. 5223; Feb. 25, 1925.

This invention relates to a method and an apparatus for the control of combustion, and aims to increase the efficiency of furnaces of all sorts. The patentee says it is of especial value when used in connection with gas-burning furnaces in which it is possible to obtain complete combustion of the fuel without heating any excess air; and that when the combustion in such furnaces is controlled in accordance with the invention, continuous perfect combustion may be obtained.

The specification is in great detail, and the apparatus complicated; but the principle on which it works will be understood from the following:

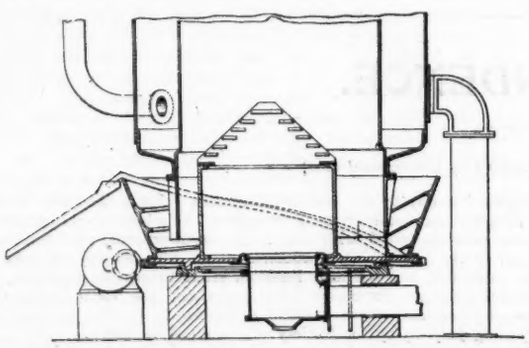
A sample of flue gas is continuously withdrawn from the upper part of the combustion space of the furnace or from the flue or chimney of the furnace; and this sample is divided into two streams. Oxygen is introduced into one of these streams, while fuel is introduced into the other. By some means, such as the application of heat or the use of a catalytic agent, any fuel and oxygen which may simultaneously be present in either stream are caused to combine. As a result, if any unburned or incompletely burned fuel is present in the flue gas, this fuel combines with the oxygen which is introduced into the first stream and raises the temperature of this stream; and, conversely, if any excess air is present in the flue gas, the oxygen contained in this air combines with the fuel which is introduced into the second stream and raises the temperature of this stream. The algebraic difference in the temperature attained in the two streams serves to indicate whether the flue gas contains a greater amount of unconsumed fuel than excess air or whether it contains more excess air than unconsumed fuel. This difference in the temperatures of the two streams is used to control automatic regulating apparatus which serves to regulate the proportionate rate of the air supply to the furnace. The regulating apparatus may be adjusted to govern the proportionate rate of air supply in such manner that complete combustion is continuously obtained in the furnace, with the minimum amount of excess air. When the control is applied to a furnace capable of perfect combustion, the controlling apparatus may be adjusted so that no excess air is used.

Mechanically-Clinkered Generators.—No. 253,326.

HUMPHREYS & GLASGOW, LTD., and GLASGOW, A. G., both of Victoria Street, S.W. 1.

No. 11,829; May 6, 1925.

This specification describes a variation of the water gas generator grate described in patent No. 238,987 [see "JOURNAL," Vol. 172, p. 41].



Mechanical Clinkering Grate.—Humphreys & Glasgow.

By reference to the drawing which accompanied the earlier specification and that now reproduced, it will be seen that instead of a water seal between the rotating bottom of the generator and the fixed air-blast, steam, or down-run gas conduit, the rotating grate structure is constructed to form, in addition to the outer water seal round the lower edge of the generator wall, a gas-tight sliding joint round that conduit. Preferably the underside of the rotated base plate is formed with a ring; and a second ring is carried by a fixed supporting wall or foundation. The lower and upper surfaces of these rings rest one on the other, forming the gas-tight sliding joint, and also serving as the bearing surfaces which evenly support the entire grate structure and superimposed fuel-bed. One of the rings may be formed with a flange which overlaps internally or externally the other, and serves as a guide to prevent lateral displacement of the grate structure. Suitable provision is made for supplying to the bearing surfaces lubricant which facilitates their movement and tends to ensure tightness of the joint. Usually the fixed ring will be flanged externally and of channel section so as to retain the lubricant. The rings may be of different metals; and either or both may be provided with renewable wearing surfaces.

Between the fixed ring and the aforesaid conduit a floor is provided, to which the conduit is connected; the latter being extended upwardly through this floor above the level of the sliding joint. The annular chamber thus formed may be charged with water or other liquid or lubricant to above the level of the sliding joint; a supply pipe and an overflow pipe being provided. By thus charging the annular chamber, gas and steam are kept from contact with the joint and from possible leakage to the atmosphere, the accumulation of a dangerous explosive mixture within this almost closed chamber is obviated, dust is prevented from reaching the joint, and the lubrication of the joint is ensured. The mouth of the conduit is overlapped by an annular plate, so that ashes falling through the grate will be directed into the conduit.

The arrangement not only provides a positive inner seal requiring but little space vertically, instead of a deep water seal, but also replaces the vertical and horizontal rollers or other means of taking the heavy weight and side thrust. Moreover, the comparatively large space obtained within the grate structure by the elimination of the inner water seal may be utilized in the case of water gas generators for a heat interchanger which transfers to the incoming air-blasts or up-run steam, or both, sensible heat contained in the outgoing down-run water gas.

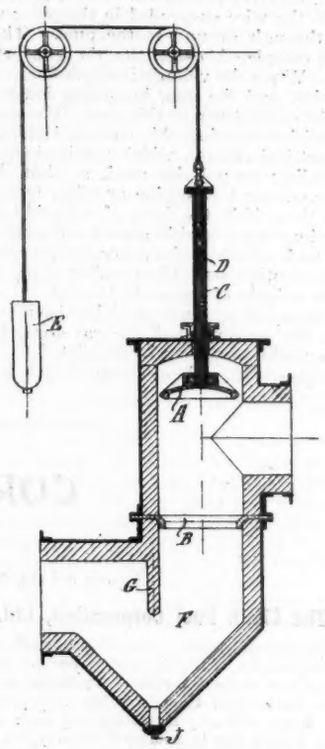
The invention may also, with advantage, be applied to completely-enclosed mechanically-clinkered generators.

Valves for Hot or Cold Gas.—No. 253,403.

SOUTH METROPOLITAN GAS COMPANY and BURTON, W. J., both of Old Kent Road, S.E. 15.

No. 25,999; Oct. 17, 1925.

The object of this invention is to provide a device comprising an ordinary regulating or shut-off gas valve, and means, independent of the valve, for obtaining a seal; such a device being useful when a number of retorts are connected through valves to a main, and it is desired to shut off a particular retort for repairs.



Gas Offtake Valve.—South Metropolitan Gas Company.

We reproduce a vertical section of the valve. A is a metal disc adapted to engage a seating B; the disc A being provided with a hollow spindle C which is normally closed by a tube D containing heat insulating material. The spindle C is detachably connected to a counterweight E. Below the seating B is a chamber F, within which is a tongue G so arranged that a seal may be formed. The material forming the seal may, when the gases are hot, consist of fine sand, or, when the gases are cold, a water seal may be provided. A funnel is supplied through which the material forming the seal may be poured, and J is a plug through which the material may be withdrawn.

Normally the valve may be closed by the disc A engaging its seating; but as the disc A and the seating B become worn and render the valve leaky, the valve may be sealed by detaching the counterweight E, removing the tube D, and pouring the sealing material into the funnel, from which it passes through the hollow spindle C, and forms a seal in the chamber F.

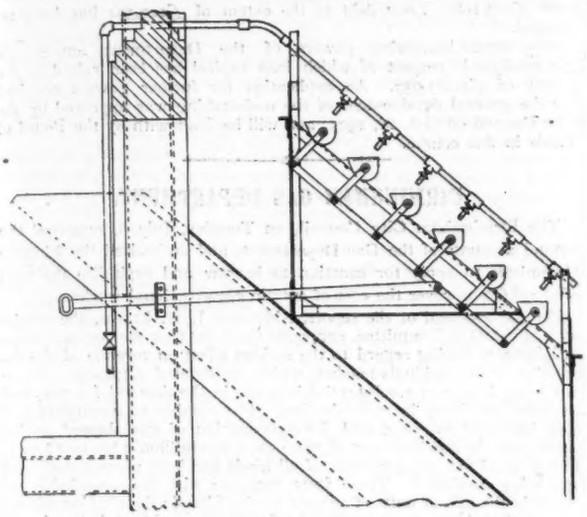
Quenching Coke.—No. 253,349.

DRAKES LTD., and DRAKE, J. W., both of Halifax.

No. 14,116; May 29, 1925.

The patentees remark that under normal conditions when red-hot coke is treated by the application of a comparatively small volume

or jet of water such as may be discharged from a hosepipe, it is found that the coke evaporates the water so quickly that, though temporarily quenched, it quickly re-ignites on exposure.



Quenching Coke.—Drakes Ltd.

This invention consists in the production of apparatus which will supply water in considerable quantities; the apparatus consisting essentially of an inclined coke trough and a series of water troughs controlled by a lever. The arrangement is clearly shown in the diagram which we reproduce.

The patentees claim the use of a series of hinged buckets which are arranged so that they may be simultaneously caused to discharge their contents on to the coke held by supporting means at an angle beneath; the buckets being pivoted upon appropriate framework under such conditions that water may be supplied to them as desired. The form of trough or chute is also claimed.

Splash Plates and Racks of Gas Cookers.

No. 253,369.

MAIN, R. & A., LTD., and AIRD, K., both of Grosvenor Gardens, S.W. 1.

No. 16,805; June 30, 1925.

The object of this invention is to construct a holding device for the splash plate and plate racks of a cooker whereby there is no lost space on the hotplate, and to provide means on the cross bar whereby the distance between the posts can be varied so as to allow of one size of plate rack and back splash plate being used with different sized hotplates.

The design is clear from the front view and part-plan, which we reproduce, and the composite claim, which is as follows: Constructing the base of each post or support carrying the cross bar, plate rack, and back splash plate of a gas cooker, with a right-angled and curved extension, a **U**-shaped arm projecting from such extension, and having its upper end disc or mushroom shape, with a flat or equivalent lower surface, a screw engaging a hole in the **U**-shaped member or extension, and so directed that its point is practically central of the disc

Fig. 1.

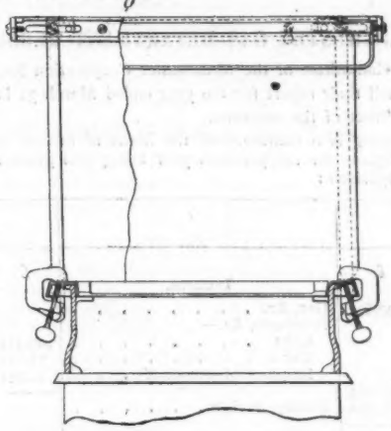
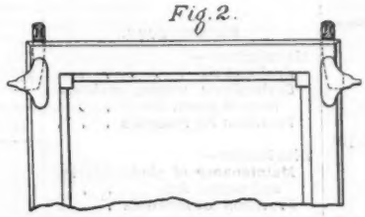


Fig. 2.



Securing Cooker Splash-Plates.—Messrs. R. & A. Main.

end; in combination with a cross bar having holes or slots at the ends which is secured to the posts or supports substantially as and in the manner described.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for July 7.]

Nos. 16,176-16,765.

BUXTON, R. H.—"Charging horizontal retorts." No. 16,572.
CROFT, C. M.—See Buxton, R. H. No. 16,572.
FOSTER & PULLEN, LTD.—"Gas lamps, &c." No. 16,610.
GILL, A.—See Foster & Pullen, Ltd. No. 16,610.
I. G. FARBENINDUSTRIE AKT.-GES.—"Manufacture of liquid products from carbonaceous materials." No. 16,222.
PERRY, W. A.—"Distillation of carbonaceous material." No. 16,434.
SIEMENS & HALSKE AKT.-GES.—"Means for testing combustion gases." No. 16,455.
SMITH, E. W., and SMITH METERS, LTD.—"Coin-freed gas meters." No. 16,575.
SPENCER, S. E.—"Wood grids for gas purifiers." No. 16,405.
SUTCLIFFE, E. R.—"Distillation of carbonaceous substances." No. 16,265.
WEST, E., and WEST'S GAS IMPROVEMENT COMPANY, LTD.—"Coke-extracting mechanism for vertical retorts." No. 16,269.
WUNENBERGER, V.—"Gas lighting device." No. 16,661.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Gas Light and Coke Company's Bill: Report from the Examiners that the further Standing Orders have been complied with. Read a second time, and committed.

Newcastle-upon-Tyne Corporation Bill: Read the third time. An amendment made. Bill passed, and sent to the Commons.

Swindon Corporation Bill: Report from the Examiners that the further Standing Orders have been complied with.

Special Orders.

Ellesmere Gas Order, Liverpool Gas Order, and Seaford Gas Order: Approved.

Burgess Hill and St. John's Common Gas Order, and Grays and Tilbury Gas Order: Referred to the Special Orders Committee.

HOUSE OF COMMONS.

Progress of Bills.

Barnet District Gas and Water Bill and London County Council (General Powers) Bill: Report that the further Standing Orders have been complied with. Bills to be read a second time.

Newcastle-upon-Tyne Corporation Bill: Read the first time, and referred to the Examiners.

Special Orders.

Ellesmere Gas Order and Seaford Gas Order: Approved.

Liverpool Gas Order and Portsea Island Gas Order: Approved, subject to modifications.

Burgess Hill and St. John's Common Gas Order and Grays and Tilbury Gas Order: Copies presented.

Gas Mantles.

Replying to Sir W. Sugden on July 5, Mr. SAMUEL stated that he was aware of the agreement that had been arrived at by certain British manufacturers of incandescent gas mantles with foreign manufacturers for a period of five years, but up to the present he had no information which suggested that it had caused any increase of price to the consumers of British gas mantles. He had made inquiries, and had found that the total wholesale increased cost only amounted to 3d. per dozen mantles. The increase was not charged to the consumer.

MYNYDDISLWYN URBAN DISTRICT COUNCIL BILL.

This Bill has been reported for third reading by the Unopposed Committee of the House of Lords (presided over by the Earl of Donoughmore). There are gas clauses in the Bill (see "JOURNAL" for Jan. 10, p. 162) to which no substantial alterations have been made, except in the case of that relating to the charge for prepayment meter supplies. Originally, the clauses provided that the minimum quarterly charge should not exceed 7s. 6d. in the December and March quarters, and 5s. in the June and September quarters. This has now been altered so that the minimum charge in any quarter shall not exceed 5s.

MISCELLANEOUS NEWS.

MANCHESTER GAS DEPARTMENT REPORT.

The Gas Committee of the Manchester Corporation have submitted to the Council their report for the year ended March 31 last, together with an abstract of the accounts.

The following is a summary of the items of income and expenditure; the figures for the previous year being also given for the purpose of comparison:

1925.			1926.	
£	£		£	£
		INCOME.		
	1,030,614	Gas, &c.		1,104,982
		Residuals, &c.—		
292,571		Coke	199,414	
64,272		Tar	75,855	
15,920		Sulphate of ammonia	21,054	
	372,763			296,323
	1,680	Sundry receipts		1,503
	1,405,057			1,402,808
		EXPENDITURE.		
		Manufacture—		
580,427		Coal and oil	537,443	
		Carbonizing wages, maintenance of plant, &c.		
195,417			203,942	
44,476		Provision for renewals	44,773	
	820,320			786,158
		Distribution—		
		Maintenance of plant, salaries and wages, &c.		
156,391			158,740	
74,907		Provision for renewals	73,098	
	231,298			231,838
	80,753	Rents, rates, &c.		81,549
		Management, collection, &c.—		
36,157		Salaries and wages	36,699	
		Less—Receivable from Electricity Committee for collection of accounts		
5,554			*5,520*	
30,603			31,179	
43,517		Other charges	48,065	
	74,120			79,244
	1,206,491			1,178,789
	198,566	Gross profit for the year		224,019
		Less—Interest on loans, &c.		
90,575			100,127	
45,946		Income-tax	12,686	
	136,521			112,813
	62,045	Net profit		111,206

The quantity of gas sold was 7,014,828,000 c.ft. The sales have been well maintained—an increase of 2·55 p.ct. being secured. The average price realized was 3s. 0·84d. per 1000 c.ft. (equivalent to 8·19d. per therm), as compared with 2s. 11·16d. (7·81d. per therm) for the previous year; the difference being attributable mainly to the increase of 4d. per 1000 c.ft. in the price of gas which took effect from Sept. 29, 1925.

The demand for cookers, fires, and high-power lighting installations continues to be satisfactory. The maintenance by the Department of consumers' burners and appliances is now well established. Important concessions have been made in respect of gas fires. Subject to a specified minimum consumption of gas chargeable at the domestic rate, standard fires are now fixed and maintained free of charge to the consumer.

The number of approved applications to be placed on the reduced scale of prices applicable to gas used for manufacturing, &c., purposes, received up to March 31 last, was 1456, in respect of which the consumption was 947,647,400 c.ft., or 13·51 p.ct. of the total sales.

The cost of coal and oil carbonized was as follows:

—	Gross Cost.	Less Income from Residuals.	Net Cost.
	s. d.	s. d.	d.
Last year, per 1000 c.ft. sold	1 6·39	0 10·14	8·25
Previous year ,, ,,	1 8·36	1 1·08	7·28

The difference represents an increase in net cost to the Committee of £28,352. The average gross cost of coal only, inclusive of cost of handling, was 22s. 8·74d. per ton, as compared with 24s. 6·21d. for the previous year. There has been a considerable fall in the income from coke. This has been counteracted to some extent by the better prices obtained for tar and sulphate of ammonia.

Additional loan capital has been raised to the extent of £284,000, mainly for the Partington Works and for mains, cookers, fires, &c. The expenditure for the year amounts to £324,736, of which sum £297,152 was provided out of loans and the balance of £27,584 out of profits. The total capital outlay at March 31, 1926, was £5,175,522, the loan debt in respect of which was £2,039,127, or 39·40 p.ct. Further important contracts amounting to £420,000 have been entered into during the year for the Partington Works. These embrace retort installations, purifying plant, ammonia recovery plant, &c.

The balance of sinking fund unapplied at the commencement of the year was £99,223, and the amount provided out of revenue for the year £123,108. Loan debt to the extent of £149,594 has been redeemed.

The total borrowing powers of the Department amount to £6,370,640, in respect of which loan capital has been raised to the extent of £4,903,937. An application for further powers required for the general development of the undertaking was approved by the City Council on Oct. 28, 1925, and will be dealt with by the Board of Trade in due course.

BIRMINGHAM GAS DEPARTMENT.

The Birmingham City Council, on Tuesday, July 6, approved the annual accounts of the Gas Department, and authorized the Finance Committee to apply for sanction to borrow and capitalize the sum of £546,681 to cover the cost of certain constructional works.

On the approval of the report, Alderman J. H. LLOYD, the Chairman of the Gas Committee, expressed the view that the accounts were satisfactory, having regard to the serious effect on revenue of the depression in the residuals market, which represented £172,000. There had been, however, a substantial increase in the demand for gas, and increased efficiency in carbonization. The number of consumers had been increased by 9000, and the consumption of gas showed an increase over the previous year of more than 730 million c.ft., or 5¾ p.ct. The demand for gas apparatus of all kinds had been phenomenal, and was being continued. These facts, together with the remarkable increase in the sale of units of current by the Electric Supply Committee, showed that there was room for the development of both industries.

Discussing the position of the Department in relation to the coal dispute, Alderman Lloyd pointed out that substantial stocks of both coal and oil were obtained many months ago. The whole of their stocking area was filled with coal, and so far they had had no difficulty in meeting the demand for gas. Owing, however, to the necessity for conserving coal by the manufacture of water gas, the Committee had had seriously to reduce the quantity of coke available for sale; but hospitals and similar institutions, and food suppliers generally, had been fully supplied. With further restrictions on coke sales, they could carry on for several weeks longer, and it was hoped to avoid the necessity of buying foreign coal. Some gas undertakings had had to increase their price of gas substantially—in one case by as much as 7½d. per 1000 c.ft.

Councillor COOPER suggested that power gas was being sold at a figure below the cost of production. His view was that the small consumer should receive further consideration in regard to price.

Councillor SHURMAN stated that good progress had been made in regard to putting in gas installations in small houses, and added that there was still further scope for such work.

Mr. HUME, a member of the Gas Committee, denied that gas was being sold by the Corporation under manufacturing cost. It was true that power gas was cheap. He held that such a policy was justified in that it meant the provision of work for the people.

Alderman LLOYD said he was satisfied that in no case did the Department sell gas under cost price. He could not hold out any hope of a reduction being made in the price of gas to any consumers. The number of houses provided with gas installations in 1924-25 was 1437, against 1805 last year.

PATENT OFFICE REPORT.

The report of Mr. W. S. Jarratt (the new Comptroller-General of Patents), covering the work of the Patent Office during the year 1925, records the substantial increase of 1633 in the number of applications, as compared with the preceding year; the figures being 33,003 for 1925, and 31,370 for 1924. The complete specifications filed totalled 19,434, or 634 more than in the year before. Applications by way of communications from abroad, at 1547, were nearly a hundred more than in 1924. The number of new patents sealed was 17,199. The sum received from fees for patents was £301,677, which compares with £385,502 in the preceding twelve months; and adding the income from designs fees and trade marks fees, the surplus of receipts by the Patent Office over expenditure was £88,540.

The number of applications made for the restoration of patents which had lapsed in consequence of the non-payment of renewal fees was 95. In 63 cases the patents were restored, 4 applications were withdrawn, and 28 are pending. There were 34 applications to the Court (covering 55 patents) for an extension of the term of patents. Some of these are still pending; but in 20 cases (covering 35 patents) extensions ranging from one year to five years were granted. At the end of 1925 there were 148 patents in force which have been prolonged beyond the normal period. The applications received from women inventors numbered 608, as compared with 493 in 1924.

Disposal of Tar at Leeds.—At a meeting of the Leeds City Council on July 7, Alderman G. Ratcliffe, Chairman of the Gas Committee, moved the minutes of the Committee, which included a statement that the Committee had received from Mr. W. G. Adam, Manager of the Tar and Chemical Works of the Gas Light and Coke Company, a report in which they were recommended to join the co-operative scheme which had been set up on the terms and conditions contained in the draft agreement with the Yorkshire Tar Distillers. The Committee had resolved that it was not desirable to instal a tar distillation plant, and negotiations were authorized for the sale of the tar produced at the gas-works to the Gas Light and Coke Company. The Committee's minutes were agreed to.

DUNDEE GAS ACCOUNTS.

The revenue of the Dundee Gas Department for the year ended May 15 last reached a total of £338,435; the net result of the year's working being that the adverse balance of £23,517 with which the period commenced has been reduced to £13,286. Manufacturing costs are £41,000 down, and returns from residuals £11,000. Sales of gas realized £5000 more.

In his report, the Engineer and Manager (Mr. J. Dickson) states that the total quantity of gas made was 1,734,803,118 c.ft., as compared with 1,688,519,283 c.ft. in the preceding year; the make per ton being 15,908 c.ft., against 15,079 c.ft. Thus 46,283,800 c.ft. more gas was obtained, with a decrease of 2929 tons in the consumption of coal. Considerable effort has been expended during the past year in bringing an efficient volume of gas to various properties inadequately provided for in this respect. The number of services thus dealt with, irrespective of new work, was 498, embracing 3052 consumers, whose supply has thereby been permanently improved. A survey of consumers' appliances was started on March 1; and a full return will be available of all consumers' premises, size of service and internal piping, available pressure with appliances in use, and other information which will serve as useful data for furthering the utility of the gas supply.

The accelerated rate of increase in building operations requires extra provision being made in respect of both manufacturing and distributing plant. During the next few years the demands upon the gas supply will necessitate consideration being given to capital expenditure under the following heads:

(1) Improved carbonizing plant.
(2) Increased purifying area.
(3) Additional gas storage capacity.
(4) Steam boilers.
(5) Duplicate compressors for high-pressure gas.
(6) Enlarged workshop accommodation for engineering, stoves, fires, meter, and complaints departments.

Certain of these matters have already been reported upon, and temporary provision has been made; but it is now essential that definite plans be prepared to equip the works within the next five years with manufacturing, purifying, and distributing plant to provide an output of from 9 million to 10 million c.ft. of gas per maximum day, compared with the present maximum of 7¾ million c.ft.

LEEDS TERCENTENARY.

At Leeds, on July 8, there was opened the biggest municipal and trade celebration in the history of the city. It is the celebration of the 300th anniversary of the granting of the existing charter of incorporation. The features include a big shopping week, trade and other processions, an "Old Leeds" exhibition, an industrial exhibition, a modern trades exhibition, a military tattoo, bands and entertainments, decorated streets and illuminated buildings, &c.

That the gas and allied industries should have a part in these celebrations in a place like Leeds goes without saying. The Gas, Electricity, and Tramways Committees of the Corporation have been responsible for the financing of a wonderful transformation of City Square from a wide space of concrete and stone around the Black Prince statue into a delightful garden with green lawns and masses of rich summer bloom. The treatment of this important city centre has been in the hands of a Committee on which is the City Gas Engineer (Mr. C. S. Shapley). The Gas and Electricity Departments are responsible for many public and private schemes of demonstration lighting. They have erected on a vacant site at Calverley Street, behind the Town Hall, two completely-equipped bungalows—an all-gas house and an all-electric house.

Interesting official handbooks and other publications have been issued in connection with the tercentenary celebrations; and one of these goes into a mass of detail as to the history of the ninety-odd industries in which Leeds engages in a more or less big way, and into the municipal services. Gas, it is shown, first appeared in Leeds public lighting service in 1818—three years after Waterloo—when leading citizens formed the Leeds Gaslight Company, obtaining parliamentary powers to produce "inflammatory air, carburetted hydrogen, or coal gas." The first gas-works were at York Street. The venture was received rather doubtfully, some of the public describing this method of superseding the old oil lighting as "a profane way to dissipating God's darkness." However, superstition was soon forgotten in the joy of the new lighting; and by 1820 some 10 million c.ft. of gas per year were being consumed. There were 250 public street gas lamps then. In 1925 Leeds had 16,389 gas lamps and 700 electric lamps in the streets; the gas consumption for street lighting last year being 254 million c.ft.

In 1835 the Leeds New Gas Company erected works on the present gas-works site of the Corporation at Meadow Lane, and in 1857 the original Gaslight Company extended by erecting works at New Wortley—also now the site of the Corporation plant. The two Companies were competitors, but in 1870 both were bought out by the Leeds Corporation at a cost of £763,225—a daring experiment in municipal trading which has since been amply justified. The total output of the two Companies, when the Corporation took control, was 870 million c.ft. per annum. Last year the Corporation output was 3407 millions. Under Corporation control the various gas-works have been completely remodelled and extended; and Leeds to-day sells gas at 3s. 9d. per 1000 c.ft. The Gas Department have contributed up to date a total of £274,312 to relief of rates. The area of supply is 33,457 acres, of which 26,263 are within the city proper. The total daily capacity of the works is 20 million c.ft., in addition to which about 1 million c.ft. daily is obtained in coke oven gas from the Middleton Colliery. The Leeds Gas Department now employ 1360 people.

Leeds has long played a big part in many phases of scientific research, and the University has a special reputation in relation to its investigations into coal gas and allied subjects. The Fuel Department of the University is in close collaboration with the Institution of Gas Engineers.

The celebrations continue until Saturday next, July 17.

INDUSTRIAL EARNINGS PER HOUR.

In a letter which Mr. J. C. C. Davidson, Parliamentary Secretary to the Admiralty, has addressed to a constituent, interesting comparisons are made between skilled and unskilled workers in the coal mines.

Mr. Davidson wrote: It is widely stated by the extremists on behalf of the miners that they are miserably paid as compared to their fellow-workers in other industries. This is not true if the wage per hour is considered. I should like to quote some facts which bear out my contention:

Rates for an Hour's Work.

	Pence.
Labourers and Semi-Skilled.	
Agriculture	8·92
Shipbuilding labourers	9 29
Engineering labourers	10·25
Railway porters (Grade 2)	11·29
Railway (goods porters)	12·50
Gas-works (labourers)	13·50
Tramway conductors	13·65
Building (labourers)	15·08
Mining (underground labourers)	15·30
Skilled Men.	
Shipwrights	14·19
Engineering fitters	14·43
Railway (signalmen)	14 83
Boot and shoe operatives	15·00
Railway (guards)	16·08
Bookbinders	18·30
Mining (timbermen)	18·80
Building (painters)	19·79
Railway (engine drivers)	21 85
Mining (coal hewers)	22·11

Commenting upon the figures, Mr. Davidson says: "In both the semi-skilled and skilled branches the miner comes out best, getting 1s. 3¼d. in the former and 1s. 10d. in the latter for an hour's work. If the skilled miner does another hour a day for the same pay, he will still be nearly at the top of the list."

SOUTHPORT GAS REPORT.

Mr. John Bond, Engineer and Manager of the Southport Corporation Gas-Works, in his annual report, states that the increase in the consumption of gas amounted in the past year to 37,573,900 c.ft., which is equivalent to 5·50 p.ct. when compared with the previous year's figures. The average price received for all gas was 2s. 10·22d. per 1000 c.ft., or 6·85d. per therm, as compared with 2s. 10·48d. per 1000 c.ft., or 6·9d. per therm. Gas has been considerably reduced in price since 1922, when it averaged 4s. 11·29d. per 1000 c.ft., or 11·90d. per therm.

The net capital indebtedness at March 31 was £158,051, equivalent to 4s. 4·64d. per 1000 c.ft. of gas sold. The gross profit for the year amounted to £19,790; and after paying interest and sinking fund charges of £15,896, there remains a balance of £3894 to be carried forward.

The Gas Committee last October organized a five days' exhibition, which was very successful; orders for over 1000 gas appliances having been received. A new showroom in Cambridge Arcade was opened in January; and between then and March 31 orders to the value of £3872 for appliances were received.

The total quantity of gas sold during the year was 720,287,700 c.ft.

Results at Workington.—At a recent meeting of the Workington Town Council, Alderman F. Hall submitted the annual report of the Gas Department for the year ended March 31, which he said was most satisfactory. The net profit was £712. The price for gas was only 3s. 2d. per 1000 c.ft.; the calorific value being 433 B.Th.U. per c.ft. The output for 1926 was 186¼ million c.ft.—an increase of over 3½ millions. In his report, Mr. Hedley Hoy, the Engineer and Manager, mentions that the Woodall-Duckham installation has continued to give excellent carbonizing results. The year, he continues, has been very active as regards the distribution department. The new showrooms have been greatly appreciated by consumers.

Bradford and a Public Lighting Engineer.—Much to the surprise of many people in Bradford, the City Council, by 36 votes to 25, rejected a proposal for the appointment of a separate Public Lighting Committee (representatives of the Gas, Electricity, Finance, and any other Committee concerned), and took no action at all in relation to the proposal to appoint a Public Lighting Engineer at a salary of £500 per annum. The recommendation, which had been given fairly general approval in the Committees—though the Gas Committee did not go all the way proposed—was an outcome of the recent report by Mr. J. F. Colquhoun, Public Lighting Engineer of Sheffield, and a leading officer of the Institution of Public Lighting Engineers, who had been called in as expert adviser after many months of inability on the part of the local authorities to come to agreement with a view to improvements in public lighting. Most of the public lighting is by gas; and though the Gas Department have demonstrated clearly how vastly better can be public lighting by gas if proportionate expenditure is allowed, the electrical enthusiasts have long been making a determined and sustained attack on the Gas Department on the subject of street lighting.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

There appears to be a sufficient quantity of good nearer Continental gas coal coming into the country at prices in the neighbourhood of 50s., f.o.r. at the discharging port, to enable the public utility undertakings to tide over their temporary difficulties. The coal seems equal in value to good gas coals produced in this country.

When work is eventually resumed in our own mines, coal may be expected in good quantities within a couple of days.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

As consumers' stocks of fuel run out, industrial operations in the Midlands are further curtailed, new supplies being entirely inadequate. It is not merely a question of fuel shortage, however; there is intensified stringency in the raw material market. Middlemen state that more of the output from the few pits that are working in Warwickshire and Staffordshire is being diverted from Birmingham. The control is administered with increased severity so far as domestic supplies are concerned. Prosecutions are being instituted for breaches of the Emergency Regulations. The Birmingham municipal gas undertaking can carry on for some little time yet; but coke is no longer being sold save for essential services, a considerable proportion of the output being applied to the manufacture of water gas. Fancy prices are being paid for outcrop coal and pit mound slack, the sale of which is unrestricted.

Foundries are still getting small consignments of hard coke; but the situation is more precarious. The exceptional terms which have been offered to the miners in the Warwickshire coalfield have elicited scarcely any response. Owners are willing to pay 55 p.ct. instead of 46·67 p.ct. on the 1911 basis for an eight-hour day, subsistence wages not to be less than in April, and the arrangement to last till March 31 next. The Federation leaders have declined to discuss a district settlement. Cannock Chase owners offer a percentage increase to 52¼ till the end of September.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, July 12.

There is no change to report in the London tar products market.

The price of pitch is nominal at about 80s. per ton with not a great deal of inquiry, and both buyer and seller seem to be waiting for a settlement of the coal strike before negotiating new business.

Creosote is firm at the price mentioned last week—namely, 7⅞d. per gallon in bulk at works.

White spirits are becoming scarce, and prices remain unchanged.

Tar Products in the Provinces.

July 12.

There is little alteration in the market for tar products. Makers are still asking for prospective prices for pitch owing to the uncertainties as to supplies of tar, while like prices are asked for Continental consumers, and there are no buyers.

Creosote is firm, and there is a good demand for home consumption.

Water-white products are decidedly scarce, and prices remain firm.

There is a little more inquiry for tar acids; but buyers are unwilling to pay any increase in price.

The average values for gas-works products during the week were: Gas-works tar, 59s. 3d. to 64s. 3d. Pitch, East Coast, 85s. to 87s. 6d. f.o.b. West Coast—Manchester, 80s. to 82s. 6d.; Liverpool, 82s. 6d. to 85s.; Clyde, 85s. to 86s. Benzole, 90 p.ct. North, 1s. 11d. to 2s.; crude, 65 p.ct. at 120° C., 1s. 3½d. to 1s. 4d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 11d. to 2s. Toluole, naked, North, 1s. 11d. to 2s. nominal. Coal-tar crude naphtha, in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 10d. Heavy naphtha, North, 1s. to 1s. 1d. Creosote, in bulk, North, liquid, 6⅝d. to 6½d.; salty, 6½d. to 6¼d.; Scotland, 5¾d. to 6d. Heavy oils, in bulk, North, 7¼d. to 7½d. Carbolic acid, 1s. 4d. to 1s. 5d. prompt. Naphthalene, £11 to £14; salts, £4 10s. to £6, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Working of the Walsall Gas Undertaking.

The report of the gas undertaking of the Walsall Corporation states that the net profit for the past year was £3362. The gross profit, however, was £29,206, as compared with £27,441 for the previous year. Breaking all previous records, the total amount of gas accounted for was 675,738,000 c.ft., compared with 631,011,000 c.ft. The total working expenses, entailed in manufacture, distribution, and management, were £138,657, against £140,435. By the sale of gas, £115,718 was realized, and by gas fittings and rentals £7899. There was a fall in the receipts from residual products from £48,751 to £42,249. The Committee express the opinion that, having regard to the exceptional conditions under which gas undertakings throughout the country have worked during the past year, the financial report is satisfactory.

Coal Supplies at Devonport.—The difficult circumstances in which gas undertakings are carrying on were illustrated by the minutes of the Gas Committee presented at the last meeting of the Plymouth Town Council. It was stated that negotiations had taken place with the Mines Department in connection with the Government's embargo on a cargo of coal, consigned to the Corporation, lying alongside Tamar Wharf, and that the cargo had now been released on payment of £605 for costs of detention. The purchase of a cargo of 1200 tons of Silesian coal was also reported.

TRADE NOTES.

Spiral-Guided Holder for Portadown.

An order for a three-lift spiral-guided gasholder in an existing brick tank 61 ft. 7 in. in diameter by 16 ft. 6 in. deep, for the Portadown Gas Light Company, has been secured by Messrs. Robert Dempster & Sons, Ltd., of Elland.

Messrs. Fried. Krupp Grusonwerk, A.-G.

We are informed by this firm that they have concluded arrangements with Messrs. J. Rolland & Co., Abbey House, Victoria Street, S.W. 1, to take over their representation (formerly carried out by Mr. W. Stamm, of 63, Queen Victoria Street, E.C., who will now collaborate with Messrs. Rolland).

Wollaston Gas Producers.

Messrs. Wollaston Gas Producers (Manchester), Ltd., have published a booklet setting forth the advantages of their patent boiler furnaces. The firm are building one of their boiler furnaces to the order of the Fuel Research Station at Greenwich; and it is hoped that interesting results will be published in due course.

Spiral-Guided Holder for Hayfield.

The Hayfield Gas Company, Ltd., have placed an order with Messrs. Robert Dempster & Sons, Ltd., of Elland, for a single-lift spiral-guided gasholder, prepared for telescoping, in a steel tank 53 ft. 6 in. in diameter by 21 ft. 6 in. deep. Messrs. Thomas Newbigging & Sons, of Manchester, are the Consulting Engineers.

Installations of Becker Ovens.

We are informed that the Carnegie Steel Company, of Clairton, Pittsburgh, have recently placed an order for six batteries of 61 Becker ovens. As there are already 366 Becker ovens in operation at these works, the total number ordered and installed now amounts to 732. The new ovens are expected to have a holding capacity of 20 short tons. The Tennessee Iron and Coal Company have recently placed an order for 63 Becker ovens, and the West Boston Gas Company have placed an order for 15 ovens. This makes the ninth gas company to adopt this type of oven for the production of town gas in the United States. The Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., are the British licensees for the Becker oven.

Price Reduction by the South Suburban Company.—The South Suburban Gas Company have notified their customers that the price of gas will be reduced by three-fifths of a penny per therm from the readings of the meters for the Midsummer quarter. This will make the price 10·4d. per therm.

Limited Gas Supply at Kirkby-in-Ashfield.—The stocks of coal having run low at the Kirkby-in-Ashfield gas-works, and the Council having decided not to replenish them with imported coal, it has become necessary to limit the consumption of gas for all purposes. The pressure during certain hours of the day will be reduced; and the supply will be completely cut-off during the night.

The Rowley Regis and Blackheath Gas Company are offering for sale by tender 750 new ordinary "B" shares of £10 each. The minimum price of issue is £10 5s. each, and tenders must be received not later than 12 noon on July 26.

The Bradford Corporation Gas Committee have decided to make the usual annual allocation of £10 for the provision of prizes to be awarded locally in connection with the Fairy Gas Competition among school children, organized by the "B.C.G.A."

The Wellington (Salop) Gas Company have given notice that from the date of the meter readings for the June quarter the price of gas in the Wellington area will be increased by 0·4d. per therm, or 2d. per 1000 c.ft. The increase is entirely due to the prolongation of the coal trouble.

In view of the fact that the operations of the Bervie Gas-Works for the past financial year have resulted in a credit balance of £306, as compared with a debit of £20 for the previous twelve months, the Town Council have decided to give the Gas Manager (Mr. Talbot) a gratuity.

The Clitheroe Corporation are undertaking to supply gas to Chatburn; and the work of laying a 9-in. main has begun. The main will be continued for nearly 2 miles, and will connect with the supply pipes through which the village has hitherto been supplied by the Bold Venture Lime Company. The work is expected to be completed by September.

The Slaithwaite Urban District Council have considered a petition complaining of the unsatisfactory lighting of streets in the district. Councillor J. Bamfort said the Huddersfield Corporation had brought gas mains into the area, and the Council were lagging behind in the matter of street lighting. The complaints were referred to the Chairman of the Lighting Committee.

The Town Clerk submitted to the Conway Town Council last week a report from Mr. Newbigging, the Gas Engineer, with reference to the sites of the proposed new works on the Morfa. Mr. Newbigging recommended a particular site, and gave his estimate of the cost. The report was approved and adopted, and the Town Clerk was instructed to take the necessary steps to obtain the statutory powers required to enable the Council to carry out the proposed works.

On the occasion of the opening of the Leeds tercentenary celebrations, the only mishap to mar a historic occasion was the firing of street decorations at the busy junction of Boar Lane and Albion Street, owing to a wire carrying the decorations causing a short circuit of tramway current wires. The paper decorations quickly got alight; and the flames travelled across a gay festoon to a great ornamental crown hanging from a rope over the centre of the circus formed by the crossing of these two busy streets. The fire brigade soon had the outbreak under control, but traffic was held up for a time.

STOCK MARKET REPORT.

THE results of the large crop of new issues which appeared last week would seem to indicate that the investing public require a higher yield than 5 p.ct. The success of the 6½ p.ct. Anglo-Canadian Pulp and Paper Mills Debenture issue was assured from the start, and the same remark applies to the 7 p.ct Sterling bonds of the Province of Westphalia. In both cases the allotments were but a small percentage of the amount applied for. On the other hand, there were four different issues on a 5 p.ct. basis which were either quoted at a discount or are still open for applications Home Government stocks, however, maintained their prices. In the Foreign Market, the further slump in the value of the franc caused French Rentes and Rails to sag; but prices firmed-up at the end of the week on the sharp recovery due to the support given to the French Government's proposals.

In the Industrial Market, shareholders and speculators in Courtaulds received a sharp shock on the announcement of the dividend reduction. While in some instances it is impossible to avoid variations of dividend, in a company of this size the maintenance of regular rates is of the utmost importance.

In the Gas Market business was normal, and there was a mixed bag of changes in quotations. Aldershot 5 p.ct. maximum dropped 2 points; Commercial 4 p.ct. and Gas Light ordinary 1 point; Imperial Continental 2 points; and Primitiva ordinary 3d. On the other hand, Hornsey 3½ p.ct. jumped 3 points, at which price this stock is still one of the cheapest on the market; Montevideo and Newcastle consolidated rose 1 point; and Tynemouth consolidated and new ¼ point. The Wandsworth stocks are the first of the June dividend companies to be quoted *ex* div., and were marked down, approximately, the value of the dividend now due.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 79, 70¾, 79¼, 80, Bombay 19s. 9d., Continental Union 27⅛, Gas Light and Coke 83, 83¼, 83⅜, 84⅛, 3½ p.ct. maximum 59⅛, 4 p.ct. preference 77, 77¼, Imperial Continental 124, Primitiva 9s. 6d., 9s. 9d., South Metropolitan 93⅜, 93⅝, South Suburban 5 p.ct. 99⅜, Tottenham "A" 109, 4 p.ct. debenture 75, Tuscan 20s., Uxbridge 5 p.ct. 90. Supplementary prices, Gas Light and Coke 5 p.ct. debenture 99, Worthing 5 p.ct. 89½.

On Tuesday, Bournemouth "B" 12¹⁵⁄₁₆, British 100, Commercial 4 p.ct. 77½, 77⅝, 78⅛, 78¼, 79½, European 5⅞, Gas Light and Coke 82½, 83, 83⅛, 83⅛, 83⅜, 3½ p.ct. 58⅜, 4 p.ct. preference 77, 78, Imperial Continental 123½, 125, Primitiva 9s. 9d., South Metropolitan 93⅛, 93⅜, 94¼, 3 p.ct. debenture 58, 58½. Supplementary prices, Bournemouth 7 p.ct. debenture 101, Croydon 5 p.ct. debenture 93½, Gas Light and Coke 5 p.ct. debenture 99.

On Wednesday, Aldershot "C" 74, 4 p.ct. preference 67, Bombay 21s., British 100, 102, European 5, Gas Light and Coke 82, 82⅛, 82⅜, 82⅛, 4 p.ct. preference 77, Imperial Continental 123½, Primitiva 9s. 6d., 9s. 10½d., South Metropolitan 93⅛, 94, Tottenham "A" 111. Supplementary prices, Croydon 7 p.ct. debenture 103, Gas Light and Coke 5 p.ct. debenture 99, Hornsey 5 p.ct. preference 85.

On Thursday, Alliance and Dublin 70⅛, British 101, Colombo 7 p.ct. preference 20s. 9d., 21s., Gas Light and Coke 82, 82⅛, 82⅛, 82⅜, 3½ p.ct. 58, 4 p.ct. preference 77, 78, 3 p.ct. debenture 59, 59⅜. Imperial Continental 123, 124, 124⅛, Primitiva 9s. 6d., 9s. 7½d., 9s. 9d., South Metropolitan 93½, Swansea 6½ p.ct. debenture 101, Tottenham "A" 111⅞. Supplementary prices, Gas Light and Coke 5 p.ct. debenture 99, Southend-on-Sea 5 p.ct. new ordinary "B" 81½, Tottenham 7½ p.ct. mortgages 102½, 103.

On Friday, Alliance and Dublin, 70½, British 101, 101⅛, 101⅜, European 5⅛, 5⅛, Gas Light and Coke 83⅛, 83⅛, 83⅞, 84, 3½ p.ct. maximum 59, 3 p.ct. debenture 59⅛. Imperial Continental 123, 124⅛, Montevideo 77½, South Metropolitan 93½. Supplementary prices, Colonial 8 p.ct. preference 22s. 6d., Gas Light and Coke 5 p.ct. debenture 99.

The money owing to the Bank of England was repaid on Friday; and the rate for new money, which opened at 4½ p.ct., eased off to 4 p.ct., finally closing at as low as 3½ p.ct. The prospects for the current week are not hopeful, however. Treasury Bills were allotted at a higher rate—£4 6s. 7·5d. p.ct., or a little over 3s. 4d. p.ct. above that for the previous week.

While the latest news is a little more optimistic, the events in France have had a very adverse effect on the value of the franc. At one time during the week the rate reached 104 to the £, and it closed on Saturday at 188. Belgian francs suffered even more, and, after reaching 209, closed at 206. In the case of the lire, buying on New York account caused a drop in the Milan rate to 135, but the rate finally depreciated to 137¾. Sterling on New York finished unaltered at 4.86⁸⁹⁄₃₂. Dutch florins moved against this country, and closed at 12.11.

Silver was lower at 30½d. per oz. for cash, and Gold remained unaltered at 84s. 11½d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3¼ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. July 9.	Rise or Fall on week.	Transactions Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Feb. 4	5	5	Aldershot 5 p.c. max. C. .	74—77	..	74
322,992	,,	,,	4	4	Do. 4 p.c. Pref. . .	67—72	−2	67
1,551,868	,,	Apl. 1	6½	6½	Alliance & Dublin Ord. .	75—80	..	79—80
374,000	,,	July 8	4	4	Do. 4 p.c. Deb. . .	60—65*	..	..
300,000	1	May 6	1/7½	1/7½	Bombay, Ltd.	1⅛—1⅛	..	19/9—21/-
170,000	10	Mar. 4	8½	8½	Bournemouth 5 p.c. . . .	12—13	..	..
425,050	10	,,	7	7	Do. B 7 p.c. . .	12—12½	..	12¹⁵⁄₁₆
275,000	10	,,	6	6	Do. Pref. 6 p.c. .	11—12	..	..
50,000	Stk.	June 24	3	3	Do. 3 p.c. Deb. .	54—57	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb. .	74—77	..	..
214,740	,,	Mar. 18	12	12	Brighton & Hove Orig. .	167—172	..	..
244,200	,,	,,	9	9	Do. A Ord. .	128—133	..	..
1,287,500	,,	Feb. 18	5	5	Bristol 5 p.c. max. . . .	88—89a	..	..
855,000	,,	Mar. 18	8	7	British Ord.	99—104	..	100—102
100,000	,,	June 24	7	7	Do. 7 p.c. Pref. . .	114—119	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. .	68—73	..	..
100,000	10	June 10	6	8	Cape Town, Ltd. . . .	6½—7⅜	..	..
100,000	10	Apl. 22	4½	4½	Do. 4½ p.c. Pref. . .	5⅞—6⅜	..	..
150,000	Stk.	June 24	4½	4½	Do. 4½ p.c. Deb. . .	66—71	..	..
626,860	,,	Feb. 18	6	6	Cardiff Con. Ord. . . .	96—99	..	..
237,860	,,	June 24	7½	7½	Do. 7½ p.c. Red. Deb. .	98—101	..	..
157,150	,,	Mar. 4	6	6½	Chester 5 p.c. Ord. . . .	87½—92½b	..	..
79,185	1	Apl. 22	12/-	12/-	Colombo Ltd. Ord. . . .	28/—30/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. .	20/—22/-	..	20/9—21/-
1,513,280	Stk.	Mar. 4	5½	5½	Commercial 4 p.c. Cap. .	77—80	−1	77½—79½
560,000	,,	,,	5/8/4	5/8/4	Do. 3½ p.c. Cap. .	77—80	..	..
475,000	,,	June 24	3	3	Do 3 p.c. Deb. .	54—57	..	..
900,000	,,	Oct. 8	—	4	Continental Union, Ltd. .	26—31	..	27½
200,000	,,	Mar. 4	7	7	Do. 7 p.c. Pref. .	85—88	..	..
737,150	,,	Mar. 4	6½	6½	Croydon sliding scale . .	95—98	..	..
403,100	,,	,,	5	5	Do. max. div.	79—82	..	..
492,270	,,	Mar. 4	6	9	Derby Con.	107—109c	..	..
55,000	,,	June 24	4	4	Do. Deb.	73—75c	..	..
209,000	,,	Mar. 4	5	5	East Hull Ord. 5 p.c. . .	86—89	..	..
50,000	,,	June 24	5	5	Eastbourne 5 p.c. Deb. .	91—96	..	..
1,002,180	10	Apl. 1	†6	†4	European, Ltd.	5—6	..	5—5⅞
18,788,960	Stk.	Feb. 18	5½	4/17/4	Gas Light & Coke 4 p.c. Ord.	82½—84½	−1	82—84½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. . .	58—61	..	58—59½
4,157,020	,,	,,	4	4	Do. 4 p.c. Con. Pref. .	76—79	..	77—78
5,602,620	,,	June 24	3	3	Do. 3 p.c. Con. Deb. .	58—61	..	59—59⅜
181,315	,,	,,	—	—	Do. 6 p.c. Br'tf'd Rd. Db.	100—105	..	..
130,000	,,	—	10	10	Do. 10 p.c. Bonds. .	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb. .	..	..	..
82,500	,,	Mar. 18	6⅔	6⅔	Hastings & St L. 5 p.c. Conv	88—93	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	68—73	..	..
70,000	10	June 10	†10	†10	Hongkong & China, Ltd. .	19½—20½	..	..
173,200	Stk.	Mar. 4	5	5	Hornsey Con. 3½ p.c. . .	69—71	+3	..
1,976,000	,,	May 20	10	‡10	Imperial Continental Cap.	121—126	−2	123—125
226,170	,,	Feb. 4	3½	3½	Do. 3½ p.c. Red. Deb.	69—72	..	..
235,242	,,	Mar. 18	6½	6½	Lea Bridge 5 p.c. Ord. . .	95—100	..	..
2,127,340	,,	Feb. 18	5½	5½	Liverpool 5 p.c. Ord. . .	80½—81½b	+½	..
600,000	,,	Mar. 18	7	7	Do. 7 p.c. Red. Pref.	102½—104½b	..	..
165,736	,,	Feb. 18	9	8	Maidstone 5 p.c. Cap. . .	115—120	..	..
63,480	,,	June 24	3	3	Do. 3 p.c. Deb. . .	53—58	..	..
75,000	5	June 24	†6	†7	Malta & Mediterranean .	5½—6½	..	..
541,920	Stk.	May 20	†4	†6	Montevideo, Ltd.	76—79	+1	..
2,061,315	,,	Mar. 4	5	5	Newcastle & Gateshead Con.	70½—71¼d	+1	..
360,929	,,	,,	4	4	Do. 4 p.c. Pref. .	75—76d	..	..
529,705	,,	June 24	3½	3½	Do. 3½ p.c. Deb. .	68—70d	..	..
15,000	,,	Mar. 4	11½	11½	North Middlesex 10 p.c. .	155—160	..	..
91,530	,,	,,	8⅗	8⅗	Do. 7 p.c. .	112—117	..	..
300,000	Stk.	May 6	9	7	Oriental, Ltd.	96—101	..	..
188,120	,,	June 24	7¼	7¼	Plym'th & Ston'house 5 p.c.	108—113	..	..
60,000	50	Mar. 4	14	14	Portsea Island B . . .	90—95	..	..
100,000	50	,,	13	13	Do. C . . .	88—93	..	..
2,289,909	1	—	—	—	Primitiva Ord.	9/3—10/3	−/3	9/6—9/10½
282,200	100	June 1	4	4	Do. 4 p.c. Red. Deb. .	83—85	..	..
600,000	Stk.	Jan. 21	4	4	Do. 4 p.c. Red. Deb. 1911	66—68	..	..
180,305	,,	June 24	4	4	Do. B. Aires 4 p.c. Rd. Db.	65—67	..	..
256,847	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	65—67	..	..
150,000	10	Mar. 18	6	6	San Paulo 6 p.c. Pref. . .	7⅛—8	..	..
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	43—46	..	..
270,000	Stk.	Mar. 18	5½	6	Sheffield A	98—100e	..	..
419,968	,,	,,	5½	6	Do. B	98—100e	..	..
1,047,000	,,	,,	5½	6	Do. C	98—100e	..	..
90,000	10	June 11	4	—	South African	5—7	..	..
6,609,895	Stk.	Mar. 4	5	7	South Met. Ord.	92½—94½	..	93½—94½
1,895,445	,,	July 8	3	3	Do. 3 p.c. Deb. . .	55—58*	−1	58—58½
734,000	,,	Mar. 4	6½	6½	Do. 6½ p.c. Red. Db.	102—104	..	..
91,500	,,	Mar. 4	8½	8½	South Shields Con. . . .	117—119d	..	..
1,187,795	,,	Mar. 4	6½	6½	South Suburban Ord. 5 p.c.	98—101	..	99⅜
368,837	,,	June 24	5	5	Do. 5 p.c. Deb.	92—95	..	..
647,740	,,	Mar. 18	5	5	South'mpton Ord. 5 p.c. max.	77—80	..	..
121,275	,,	June 24	4	4	Do. 4 p.c. Deb.	68—73	..	..
250,000	,,	Mar. 4	7	7	Swansea 7 p.c. Red. Pref. .	100—103	+1	..
200,000	,,	June 24	6½	6½	Do. 6½ p.c. Red. Deb.	99—101	..	101
120,000	,,	Feb. 18	7⅛	7⅛	Tottenham District A 5 p.c.	108—113	..	109—111¾
882,275	,,	,,	5⅞	5⅞	Do. B 3½ p.c.	88—91	..	..
150,000	,,	,,	28/4	5½	Do. 5½ p.c. Pref.	101—103	..	..
181,255	,,	June 10	4	4	Do. 4 p.c. Deb.	73—76	..	75
258,251	,,	Mar. 18	5	5	Tynemouth Con. and New	67½—68¼d	+¼	..
197,294	,,	Mar. 4	6⅔	6⅔	Uxbridge, Maidenhead, & Wycombe 5 p.c. . . .	90—95	..	90
88,330	,,	,,	5	5	Do. 5 p.c. pref. .	82—87	..	..
91,800	,,	,,	6⅔	6⅔	Do. 5 p.c. Maidenh'd	87—92	..	..
30,000	,,	July 8	8¼	8¼	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c. .	120—125*	−3	..
255,636	,,	,,	7	7	Do. B 3½ p.c. .	100—105*	−3	..
412,450	,,	,,	5/19/0	5/19/0	Do. C and New	86—91*	−2	..
352,000	,,	,,	6⅔	6⅔	Wimbledon 5 p.c. . . .	96—101*	−2	..
98,000	,,	,,	7⅛	7⅛	Epsom 5 p.c.	102—107*	−3	..
88,416	,,	June 24	3	3	3 p.c. Deb.	54—57	..	..

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